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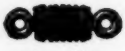

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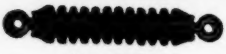

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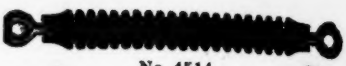

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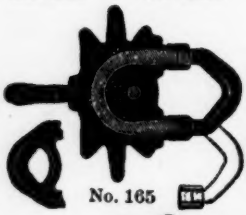

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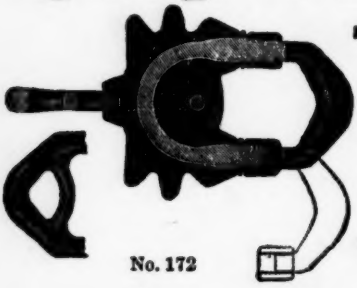

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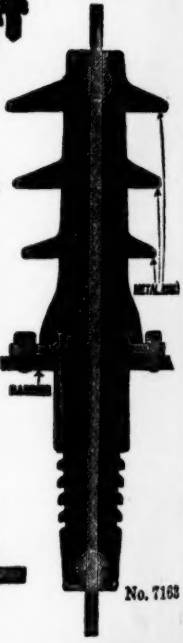

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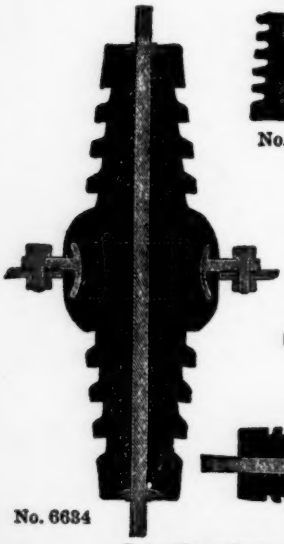

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Very Truly Yours
S. B. Luce
Rear Admiral, U.S. Navy

UNITED STATES
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PROCEEDINGS

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

STEPHEN B. LUCE

AN APPRECIATION

By REAR ADMIRAL BRADLEY A. FISKE, U. S. Navy

Some men go through life selling their services at high prices. Such men amass wealth, or achieve great rank or high position; some of these give but little service, some give practically none, and some give less than none, and do more harm than good. Most of us go through life receiving, for the moderate services which our abilities enable us to render, only moderate recompense in position, rank or money. A few men go through life rendering service of great merit, and receive but scant return in any of the world's commodities; while a still smaller number give services of inestimable value, and not only receive a paltry return of any kind, but are misunderstood and even ridiculed, because of them, by many of their contemporaries. In this last group was Rear Admiral Luce.

A personality like that of Luce stands out with a distinctness that is almost painful against the background of ordinary men. One cannot put him into any recognized class of men, because there is no recognized class of men, distinguished by characteristics such as distinguished him.

The statement cannot reasonably be questioned that the United States Navy owes more to him than to any other man who was ever connected with it, directly or indirectly. There have been other men to whom the navy owes its gratitude, such as Maury, Isherwood, Ericsson, John G. Walker, Mahan, Harry Taylor, and

Roosevelt, when President. What we owe to each of these is clearly understood and recognized, because it was for some distinct material service; what we owe to Luce is not clearly understood, and is only imperfectly recognized, for the reason that the services which he rendered were almost wholly spiritual and mental.

Luce taught the navy to think. This does not mean that he taught engineers to think about engines, or ordnance officers to think about guns, or constructors to think about stream lines, or electricians to think about dynamos: but it does mean he taught the navy to think about the navy as a whole. He realized more clearly than any man before him, and more clearly than most men now, that a navy is no more a collection of parts than an orchestra is a collection of musicians; he saw that a navy, in order to be good, must be directed as an entirety along a preconceived and definite line of strategy, just as an orchestra must be directed as an entirety to the rendering of a preconceived and definite tune; he perceived that, no matter how perfect the separate parts of a navy or an orchestra may be, the main effort must be, first to conceive a good plan to work on, or a good tune to play, and second to secure a competent strategical direction in one case or a competent orchestra conductor in the other case, in order that the plan may be efficiently carried out, or the tune correctly played. Luce made the navy think about these things and, finally, before his death, realize their importance to the nation.

Luce saw strategy as clearly as most of us see a material object. It first appeared to him, as he often stated, after a brief interview with General Sherman, shortly before the fall of Savannah in our Civil War. Scales seemed suddenly to fall from before his mental eyes, and he saw the problem of war almost as in a vision.

Judged by the standard of Luce's material interests, this was perhaps the most unfortunate occurrence of his life; because he became forthwith the prophet without honor in his own country. His abilities in all lines of his profession were so great, his health so good, and his personality so delightful, that his way through life might have been of the pleasantest, and blessed with occasional assignments to those positions of departmental power, culminating in chief of bureauship, which sometimes give color and splendor to the stern gray rigors of a naval life. But Luce, by his own acts, removed all possibilities of any such fine things for himself. He became the solitary propagandist of an unpopular doctrine.

He undertook the task alone of bringing about what he saw must be brought about, lest the nation perish. He insistently pointed out what most officers are beginning only now to see—that the legalized administration of the Navy Department provided only the tools to work with, and did not provide for laying out the work, for doing which the tools were to be used. With pen and with spoken word, early and late, and all the time, he continued, year after year, to point out to non-receptive minds the fact so clear to him, and to us now, that everything for naval success had been provided, except the most important thing—the basic plan.

That the bureau chiefs should not have approved of Luce's ideas we can easily understand, and without imputing undue shortsightedness or selfishness to any of them; because it is wholly natural, and in some ways proper, that a specialist should regard his own specialty as the all-important element, and should fail to see why it should be subordinated to so intangible and "theoretical" a thing as strategy. It does seem strange, however, that for more than 40 years, the great body of naval officers, even of line officers, should have opposed Luce's propaganda; that the War College should have been contemned and ridiculed, and that the greatest single service ever rendered to the navy, should have been spurned with contumely. That Luce should have been pronounced unpractical at the start, is also not hard to understand; but it is hard to understand why, after the War College had been actually established, and after most of the ideas for which he had been called unpractical had been found to be wholly practical—he should still have remained unpractical, in the judgment of his contemporaries!

The establishment of the Naval War College is usually spoken of as the greatest achievement of Luce's life, and the college itself is sometimes called his monument. But was not the establishment of the college merely an incident, and is not the college itself merely a heap of stones, in comparison with the thought which Luce finally planted in the mind of the navy, and with the spirit which he put into its heart? The agency which introduced the thought was the mind of Luce, and the agency which infused the spirit was the spirit of Luce: as between the two, the spirit was the finer.

For though few men have been endowed with such a mind as his, far fewer have been filled with such a spirit. To see clearly

what he saw was the feat of a trained imagination; to make others see it, despite themselves, was the deed of a born leader of men: but to persist year after year, against opposition both active and passive, to withstand ridicule, to endure the official disapproval which is the hardest cross for a trained officer to bear, and to sacrifice the worldly rewards he could have grasped—constituted a life of persistent heroism, that is almost unprecedented, on so large a scale and for so long a time.

And how much more wonderful does his self-sacrifice appear, and how much more inspiring does his example become, when we realize that all he sacrificed was sacrificed uncomplainingly, unostentatiously and it seemed almost unconsciously! There was no martyr's pose, no appeal for sympathy, no self-pity, no contempt for those who did not think as he did, no bitterness, no sarcasm, no reproaches. On the contrary, he was perfectly good natured all the time; witty allusions lightened his most convincing arguments; and a superabundant humor, that seemed to bubble up from an inexhaustible reservoir, accompanied almost every act and word and even gesture. To the joyous, buoyant Luce, in whom rollicking fun was an abiding characteristic, even in his later years, any other course of conduct would have been impossible. The man who, as captain of a ship, would "skin the cat" in his frock coat, jumping up and catching hold of two hammock hooks in his cabin; who could not be "dignified" for any but brief periods; who did not have to be dignified, because of the natural dignity of his mind and character to which all about him bowed in unaffected deference, who talked and acted always with the frank straightforwardness of a manly boy—such a man could no more harbor ill-will than he could harbor thoughts of undue self-aggrandizement; could no more affect a pose than he could play politics; could no more indulge in self-pity than he could do anything else unmanly. His sense of humor was too keen, his perception of incongruity too correct, his desires too utterly impersonal, his ambition set on purposes too high, to permit him—save for rare brief intervals—to be untrue to his own magnanimous self.

The most inspiring personality our navy ever produced has passed away, but his influence will stay with it always, beneficent but unrecognized. Even now, so subtly has his spirit been diffused, we do not realize how much we owe him; and as time goes on, the realization will become dimmer and dimmer still. Yet, as time

goes on, it will spread over wider and wider fields, and affect the conduct of increasing numbers.

Every man exerts some influence: the lives of even the humblest of us exert some pressure on the lives of others. The lives which exert the greatest influence are the lives of men who apprehend truths that other men have not apprehended, and who, by force of mind and will, and usually by self-sacrifice as well, are able finally to make others apprehend those truths, and follow the paths those truths point out.

Such a man was Luce. More clearly than any other man in American history, he saw the relations that ought to exist between the central government and its military and naval agencies; more clearly than any other man, he saw that an army or a navy is not a class of mercenaries, hired by a government to do its fighting, but a component and important part of the government itself; more clearly than any other officer of either our army or our navy, he perceived the paramount importance of strategy; more clearly than any other naval officer in the world, he realized the necessity of studying naval war by the methods in miniature of the game board; to him, more than to any other naval officer who ever lived, are the naval officers of every nation indebted for the understanding they now have of the actual character of their profession.

Some may feel that we owe as much to Mahan as we owe to Luce. Our debt to Mahan we all admit with gratitude: but let us not forget that it was Luce who discovered Mahan, when Mahan was an obscure commander, and persuaded him to undertake the presidency of the new War College; that it was Luce who steered Mahan aright along the first steps in the career that was to make him famous through all the world; and that it was Luce who inspired and made possible Mahan's epochal work "The Influence of Sea Power on History."

To the Naval Institute, the memory of Luce is especially inspiring, and to the Naval Institute he did especial honor: the first article in the first number of the PROCEEDINGS OF THE INSTITUTE was written by him, and he was for 11 years its president.

Just a year ago, and for the last time, I had the honor of grasping his hand. He was past the age of four score years and eight; but the sane and active life that he had led, and the marvellous physical and mental balance that made him what he was, showed clearly their influence then to the glance of any

observant man. True, the hearing was dull, and the walk was slow, and the voice was faint: but the keen grey eye, and the quizzical smile, and the scrupulous neatness, and the erect carriage, and the searching question, and the magnificent head were present still; and they gave to his fragile form a pathetic yet grand ennoblement.

DONALD B. MACMILLAN
LEADER

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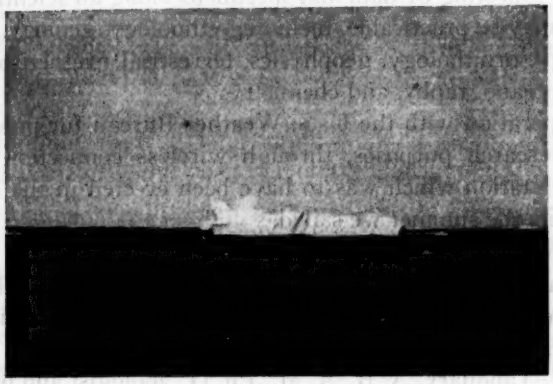
ARCTIC DUTY

WITH THE

CROCKER LAND EXPEDITION

By LIEUTENANT FITZHUGH GREEN, U. S. Navy

NORTHWARDS



Let us probe the silent places, let us see what luck betide us;
Let us journey to a lonely land I know.
There's a whisper in the night wind, there's a star agleam to guide us;
For the wild is calling, calling,—let us go. . . . .

The Crocker Land Expedition was organized under the auspices of the American Museum of Natural History, in New York, and the American Geographical Society. Contributors of funds and equipment to the expedition included Yale, Harvard, Bowdoin, and Illinois universities, and the federal government.

The purpose of the expedition was to solve the last great geographical problem of the north: Is there in the Polar Sea a large body of land still undiscovered?

Geographers produced evidence contrary to this supposition. Oceanographers and tidal experts upheld it. Finally in 1906

Admiral Peary reported that from the height of Cape Thomas Hubbard in Axel Heiberg Land he believed he saw in the northwest 130 miles across the frozen wastes of the Polar Sea the "snow clad summits of a distant land." He named it Crocker Land after one of his backers, and the expedition hereinafter described had as its chief aim the verification of this report.

The objects of the expedition were scientific in character and may be briefly summarized as:

a. Actual visiting, reconnoitering, and mapping of Crocker Land or the sea ice at or about its supposed vicinity.

b. Scientific exploration of the region between Flagler Bay and Cape Thomas Hubbard; and of the Ellsemere Land interior.

c. The attainment of the Greenland Ice Cap east of Cape York.

d. The collecting of data and specimens along all scientific lines as far as may be practicable, including ethnology, geology, botany, seismology, ornithology, geophysics, terrestrial magnetism, meteorology, oceanography, and chemistry.

e. Cooperation with the U. S. Weather Bureau for practical as well as research purposes, through wireless connection with a Canadian station which was to have been erected in the Hudson Bay district the summer we sailed.

The scientific staff was as follows:

Donald B. MacMillan, A. B., A. M., leader and ethnologist.
Fitzhugh Green, M. S., U. S. N., engineer and physicist.
W. E. Ekblaw, A. B., D. Sc., geologist and botanist.
M. C. Tanquary, A. B., A. M., Ph. D., zoologist and biologist.
Harrison J. Hunt, A. B., M. D., bacteriologist and surgeon.

Jerome Lee Allen, chief electrician, received orders from the Navy Department to join in New York; and Jonathan Small was engaged at Battle Harbor, Labrador as cook and mechanic.

The following excerpt from my orders defines my status on the expedition:

> On June 2, 1913, you will regard yourself detached from duty under instruction . . . will proceed to New York, N. Y., and report on board the steam whaler *Diana* for duty in connection with the fitting out of the Crocker Land Expedition, and for duty on board that vessel in charge of topographic and magnetic surveys, wireless and hydrographic work to be undertaken in arctic regions. . . . .
>
> JOSEPHUS DANIELS,
> *Secretary of the Navy.*

* * *

Chronological summary of the expedition to date:

June 30, 1912. Due to start. Delayed by the drowning of George Borup, geologist of the expedition.

July 2, 1913. Sailed from the New York Navy Yard in the *Diana*.

July 16, 1913. *Diana* wrecked in Belle Isle Straits, Labrador.

August 1, 1913. Sailed from St. Johns, Newfoundland, in sealer *Erik*.

August 6, 1913. Sailed from Battle Harbor, Labrador.

August 30, 1913. Blocked by ice, established base in Foulke Fiord.

February to June, 1914. MacMillan and Green made 1280-mile sledge journey across Ellsemere Land and out on the Polar Sea, encroaching upon unexplored area, but failing to discover Crocker Land at or near its supposed location. Peary's cairns and records picked up.

June to December, 1914. Scientific and local exploratory work including inland ice. Wireless station set up outside Foulke Fiord on small island.

January to June, 1915. Sledge exploration of unknown portions of Ellsemere Land. Dr. Ekblaw discovered and mapped new area. Dr. Tanquary made extended visit to South Greenland and was badly frozen. Green, Hunt, and MacMillan on separate sledge trips north and west.

September, 1915. Ill-fated *Cluett* arrived, embarked expedition, was crushed in the ice and forced to winter in Parker Snow Bay with seventeen men aboard and provisions for only about three months.

September to December, 1915. Return to Etah and other Eskimo settlements in order to obtain food and skins for *Cluett's* crew, and to outfit a party hoping to reach South Greenland and thence to Copenhagen in hope of getting help.

January to June, 1916. One thousand miles of dog driving in race to catch little Danish oil steamer touching at South Greenland and thence to some English port. Allen, Tanquary, and Green reach Egedesminde and find that the war has confused all shipping and made any sort of plans nearly impossible.

July, 1916. Danish steamer *Danmark* chartered, coaled at Ivigtut, and dispatched to the relief of the other members of the expedition. Green and Allen take passage to Copenhagen.

August 3, 1916. *Danmark* last heard from.

July 6, 1917. New relief ship *Neptune* sailed from Sydney, N. S., under command of Capt. Bob Bartlett. This was the sixth vessel engaged for the expedition.

July, 1917. Doctors Hunt and Hovey, the latter a member of the Cluett's relief party, report via Faroe Islands that *Danmark* is fast in the ice, members of the expedition are safe but in dire need of help. MacMillan has discovered new land to the west of Axel Heiberg Land.

My books, papers and diaries are still in Greenland. I write entirely from memory after a busy winter and an eventful spring in the fleet. This outline is meant merely to convey the intentions of the expedition and its present situation to those of the service who may be interested or possibly only curious.

I returned from the north more empty handed than Ulysses and twice as dirty. But my companions have not yet come and my Odyssey is but a chapter in the work and the misery and the happiness our little party bore together until their misfortune became my fortune. While they endured the tragedy of waiting I knew the bliss of return. But the sweetness of my safety is yet tempered by their absence.

We sent them help but have heard no satisfactory word. Whether the relief ship reached them, or was crushed in the Melville ice or broke her back on a reef in those uncharted waters, we do not know. When the midnight sun will have burst the barriers of darkness and bitter cold we shall send again.

Germany has extended her blockade zone to 75° north latitude, within 200 miles of our base. The little Danish ship I caught last summer dare not make her annual voyage. But my friends expect her. Some of them will be in South Greenland to meet her. They must not be disappointed again. Wherefore it is assured that the new ship, a staunch Newfoundland sealer, be of the best, and her Captain, Bob Bartlett, of North Pole fame, a man who has yet to fail.

* * *

I reached Copenhagen one hot evening late last August. In the best hotel's best bedroom I interviewed the head waiter.

"Bring me poached eggs and a double meringue" . . . . I needed no list; I had carried my own in my mind for months . . . . "and Brussels sprouts, escalloped artichokes, and broiled lobster. One large sirloin steak," . . . . I think I cautioned him

to have it rare and the fat untrimmed. And finally, "chocolate cake and fruit and a large pitcher of milk."

For more than three years I had tasted none of these. Often in my dreams in my caribou skin bag had I been seated at such a banquet but always the hungry morning came before I was able to seize one morsel of the fragrant viands. Here was the dream come true, the ever present dream of one who sledges in the Arctic: Food.

Yet I did not reflect upon my providential deliverance from ice and cold. I regarded not at all the rosy future of my aspirations. Ideational processes bore all the crudity of creature desire. I simply sat and stuffed; and through it stared at the bed. Thrilled with anticipation I tried to imagine how real clean sheets and gentle bed springs would feel.

Clinging to a bunch of luscious grapes with one hand, with the other I loosened the cords of my Eskimo boots. But on the edge of the bed I lingered between the grapes and the sheets. For one wonderful moment I saw life in its true values: the comfort of *enough;* the luxury of *ease;* the beauty of *simply living.*

I slipped out of my primitive skin garments and crawled in. To my dying day shall I remember in all vividness the unspeakable sensuous rapture of that experience. The coolness and exquisite softness of my coverings soothed me. I fell asleep. The past drifted away like mist before cool evening breezes. The rush and the pound of blizzards; the day-long torture of rough and nubbled sea-ice; the stench of foul igloos; the aching muscles. . . . . All were no longer even memories. . . . .

I awoke. . . . . Where was I? Ugh! what air; not its closeness nor its smell, I was used to them, but its terrible strangeness. . . . . No comforting wail of a lonely dog; only a deathlike stillness broken now and then by a distant but dreadful rattle. No exhilarating slam and snap of the gale; just a creeping breath which stirred my curtain in a ghostlike way.

I fought off my uneasiness but failed. I got up and looked out through the window. Then I knew the truth. Gray dawn lit the rectangle of sky above and the long narrow coffin-like street below. But my view stopped short at the opposite wall. . . . . No wide spaces to a crimson horizon. No red towering cliffs backed up to the clean ice shimmering misty white against the blue sky. No crashing, lumbering ice-pack sweeping like a live thing into the

fire in the south. No sleeping dogs half buried in the snow and wanting but a word to leap into life. Not even a circling raven. . . . . Only the loathsome filth of burrowing, building man and the faint twitching of his sleeping vanity.

An indescribable loneliness seized me. Already man was awakening; soon he would fill the streets. I should know him, speak to him of the beauty of the Great White North and of my longing for it. Yet never, never would he understand.

* * *

Many wonder why we go into the Arctic. I think it must be the adventure. As a boy I lived in an atmosphere of adventure. The little western town where I was born knew fewer Indians in its bloodiest days than I saw forty years later when written romance flooded my imagination like wine. Now, with my memories of bear and ice-pack, stand unashamed crisp winter nights on that white ribbon the River Platte hangs in January across the prairies. I hear again the soft crunch of moccasins in the snow and a boy's clean whistle across the clearing where one faint light marked the shack we had built.

Followed long years of a boy's school drudgery. But always like jewels in a tarnished ring glisten those bright days in the wild wide country where Indians and Eskimos could be had for the wishing and dogs were human companions.

I entered the navy like most of us, thrilled by the glamor of it all. But I concealed my specific motive: One great portion of the earth remained about which man could yet surmise. There might I find life past imagination. I knew arctic literature as the theologist knows his bible. I perceived that most arctic explorers had been naval officers: Barrow, Franklin, Kane, Nares, Beaumont, Abruzzi, Shackleton, Scott and Peary, every one of them. Annapolis was the gateway to my desire.

My earlier disappointments are too personal for publication. And on that warm July evening in 1908 when I saw Peary leave Long Island Sound for his last successful expedition I felt that I had lived in vain.

But the Pole is only a point; while the Polar Sea is hundreds of thousands of square miles in area. Much exploration remained to be done; and Peary himself urged inquiry across the vast unexplored area north of the American Archipelago. From Cape Thomas Hubbard, the northern extremity of Axel Heiberg Land,

in June, 1906, Peary scanned the northern horizon. He writes: "The clear day greatly favored my work in making a round of angles; and with glasses I could make out apparently a little more distinctly in the northwest above the ice horizon the snow clad summits of a distant land." He named his discovery Crocker Land.

Geologists politely controverted this report. Experiment has proved that when a sphere of viscous matter is revolved it tends to assume the form of a tetrahedron with the axis of revolution through one apex and the center of one plane. Apices and surfaces are distinct protuberances and flattenings on the spherical area. Granting that the earth may be considered as formerly if not at present viscous to a sufficient degree, this hypothesis may be applied to the present distribution of land and sea. The result is startling. American continents and shallows bulge to a very discernible dihedral angle whose faces submerge in the Pacific and our great central plains. Northwest Canada and Alaska rise to a grand apex with crests like those of St. Elias and McKinley to aid the imagination. Another vast earth ridge lies between Europe and Asia. A third of lesser apparent magnitude looms along the west Pacific islets, whose cones are a series of gigantic pickets out of the sea.

This is sufficient to establish the geometrical paradox; though so far we cannot positively determine toward which axis it is the edges converge. Cape Horn, Cape Good Hope, and South East Cape (Tasmania) leave little doubt in our minds. But when we analyze the magnificent work of Shackleton, Amundsen, and Scott we see that it is the icy pinnacle of the vast antarctic continent towards which our great planetary gables point.

The North Pole must therefore be located at the center of the fourth tetrahedral surface, which is bounded by an equilateral triangle whose sides may roughly be paralleled by lines drawn from central Alaska to the ridge of the Greenland ice-cap, and from these points to somewhere near the center of the Gulf of Obi at the northern end of the Ural Range in western Siberia. Of course the actual triangle we imagine lies in a more southern latitude. But for the purpose of this discussion bounding points within the arctic regions are more elucidating. Finally Peary's soundings near the Pole gave a depth of about 1500 fathoms, which is not far from the elevation of the south Polar Plateau (11,000

feet), or the average altitudes at or near the apices in Alaska, Greenland, and Siberia.

Hence the geologists and physiographists concluded that the Polar Sea would prove to be a vast basin analogous to our other ocean areas and sloping only very gradually to the continental shelves which bound it. Contributing to this belief is the fact that Sverdrup reported the Grant Land earth folds grew gradually less sharp near the coast, while the shelving plains of the North American Barren Lands and the Siberian steppes completed the testimony.

So it came about that the Crocker Land Expedition was based upon a controversy, the eyes of the traveller pitted against the theories of the scientists. And, as I write, there remain among those who ponder upon such obscurities much cause for mystification. MacMillan and I penetrated the Polar Sea well beyond the point marked land by Peary, and found only a white desolation of tide-ruptured ice. Yet, upon our return, we too saw from the heights of the northernmost cape a land, or something so like land, that had we not been out we too should have come back certain of its existence.

But most tempting of all, at least to me, still remains: Within the inception of the expedition lay embedded a legend of the Eskimos which described a distant oasis inhabited by their own race. So perfect was this spot, say they, in its abundance of game and sunlight that he who settled there whether from fortune or design, never returned. The bliss of endless seasons and easy plenty at once cleared memory of mother and wife and even children—the Eskimo's most loved possession. Thus were accounted for those who went away into the night and stayed. To be sure there were the *Klavitoqs*, spirits of the Inland Ice: those whom the blizzard and the darkness slew; many and many the whispering invisible shadows of the glaciers; and by almost every blue-black berg of the long silent night dwelt some ghostly relic of one who had been swallowed up by the particular demon of that spot. But there were always some inexplicably absent who had departed with deceit and through many seasons had retained their silence. These missing members of the tribe might well be found in such an isolated spot as the one we sought. While the younger hunters reiterated *no*, the older *Angekoqs* (Medicine Men) agreed upon a common acceptance of the truth that the land was really nearer than many could guess.

Our white *Angekoqs* also said "no," and spun a putty ball to prove their contention. Finally though, there set eyes upon the distant shores a sailorman, a breed as you well may know with none of the barbarian's narrow mysticism, and yet possessing imagination which in the gelid scientist is too often atrophied. Nearly twenty years after his first reconnaissance upon the Greenland Ice Cap, Peary gave us this problem in concrete form.

I cannot give the full debate which covered a period of several years before we left. It is interesting to note that Capt. Kellett and others sailing north of Alaska had long before reported land to the northward. Dr. R. A. Harris, tidal expert of the U. S. Coast and Geodetic Survey, published in the *National Geographic Magazine* of June, 1904, his study of tides, winds, ice conditions and ocean temperatures. He showed that movement of tides and currents across the top of the world from the Franz Joseph archipelago and Spitzbergen to Bering Strait along Alaska is mysteriously retarded. He argued that the only solution was Crocker Land.

But I liked the legend best. Let sages shake their dice box of facts and figures and roll a loaded combination to their own gain. The game which I would play is lose-all win-all and *men* at the board. What if the Polar Sea were ice afloat and the bottom a thousand fathoms down? Land had been seen. Cold could not mar the dream. Volcanic ashes have fallen in Greenland; the Aleutians are buried furnaces. If there be an ice-cooled desert why not a steam-heated Polar Paradise? Find your Jules Verne and follow me to the center of the earth through the Iceland crater!

Men can live anywhere. Within our generation some dozen of tribes have been found who never before saw a white man. Scarcely five years ago Stefannsson stumbled upon strange tribes in Coronation Gulf north of Canada who thought him a god. Not even a tradition had they of his kind. Again it is told that in the center of the Greenland ice-desert lies a populous valley where eider ducks and ptarmigan are tame, and the seal come to the igloos for food. Ridiculous, you say? Not at all. But four times has Greenland been crossed, and Greenland is one thousand five hundred miles from tip to tip, close upon ten thousand feet in altitude, and such endless blizzards rage upon its great white breast as froze the eyes of Captain Koch's ponies (in 1912) until

they rolled out of their sockets. "They're true, these legends, every one of them—until they're disproved," exclaimed one adventurer. He, I say, was a true adventurer.

> Yea I sang as I now sing when the Prehistoric Spring
> Made the piled Biscayan ice-pack split and shove;
> And the troll and gnome and dwerg,
> And the gods of cliff and berg
> Were about me and beneath me and above.

* * *

Only seven men could go. The horrors of past expeditions when scores of men perished in a single arctic night had proved the danger of a large personnel. MacMillan, who has been to sea for years, has explored Labrador and accompanied Peary on his North Pole trip, was leader of the expedition. He is a graduate of Bowdoin and Harvard where he specialized in ethnology and ornithology. His experience has been a thorough apprenticeship for a work which requires all of the resource and originality within the compass of man's intelligence.

Dr. M. C. Tanquary was our zoologist and entomologist. He also took an active part in all scientific and sledging work. His past years have been spent under the government and in several university laboratories.

Dr. W. E. Ekblaw undertook all geological and botanical investigations. He became one of the most expert dog drivers in the party and in 1915 led his own division through Greely Fiord which had never before been traversed by any man.

J. L. Allen, chief electrician, was wireless operator and gas engine expert. He received special training at the general electric shops and factories and had been a government radio man for a number of years. J. C. Small, for nine years leading man at the Peaked Hill Life Saving Station, Cape Cod, was our general handy man. He was an excellent carpenter and had built boats since a boy.

Prior to leaving I received special instruction in seismology and meteorology and underwent a short course of training at the Carnegie Institute in Washington along the lines of terrestrial magnetism. Each man concentrated upon his own work under the leader's direction, but all cooperated in such a way that scarcely any result or record from calibration to cooking and carpentering, from research to repairing, was got that did

not bear the direct contribution of every member of the expedition.

Dr. Harrison J. Hunt was the surgeon. He is a brother of Commander W. M. Hunt, U. S. N. I mention him out of the list of the exploring staff of the expedition as his duties were to have been only in connection with our health and the bacteriological work. However, when we set out to travel and hunt, to our surprise the sedentary surgeon proved nearly the best of the crowd. His experience at sea and in the woods gave him a head start which even the Eskimos were quick to notice when

LIEUT. FITZHUGH GREEN, U. S. N.

they remarked that the big doctor would be a tribesman before anyone else of our party.

Those are the names and occupations of the men. Their qualifications and personal characteristics I need not describe except to congratulate myself on having served with them. Confined as we were in just a shanty, we knew each other as our own mothers never knew us; and such exceeding discrimination as could with my intimacy justly depict their vices and virtues I have not got. Suffice it to say that they wore amazingly well.

* * *

We gathered in New York towards the end of June. Each had his own part of the equipment to label and see aboard ship. No one who has not been connected with some such expedition can imagine the indescribable multitudinousness of its details. Later we found thermograph blanks for twenty-five years but no cake turner. Even before we unpacked we were longing for woolen wristlets and yet had remembered to bring enough dehydro spinach to feed the whole tribe of Eskimos. Jot Small seriously contemplated distilling some kind of patent medicine from the spinach. I think he ended by replenishing his rather scanty tobacco supply with it.

System was by no means lacking. We knew the weights to an ounce of everything from the torsionless fiber of the magnetometer to the seventeen tons of Spratt's Dog Biscuit. Famous dieticians and physiologists had contributed their theories to the choice of our provisions. Years of experience by explorers in every part of the world had gone into the practicality of the food values we assigned. Our rations must meet the requirements of cold, utter lack of resources and complete isolation. Our bodies must be highly fueled for the exhausting strains of low temperatures, but our nerves and our palates must be refreshed by the change, which, when absent, means rotten gums and scurvy madness.

We expected skins from the Eskimos but could not count on them. So far as we knew our coal would last; but a score of ships have foundered north and left their men fuelless. The science of arctic travel demands stoves, food, clothes, sledges, and other equipment of mathematical precision as regards their design and application. No more beautiful proof to this can be found than the experience of Dr. Porsild the Danish scientist who investigated sledge development through the tribes and discovered that ages of experiment had led these real cave-men to cut their *komotik* bows in an almost perfect logarithmic curve which can be mathematically proved to absorb the shocks of ice collisions more efficiently than any other form.

Each -ology of the ten we boasted meant nothing without its own paraphernalia. We must equip a complete wireless station, a full chemical and physical laboratory, machine shop, carpenter shop, photographic room; and, most important of all, a properly supplied kitchen and pantry . . . . for upon them depends

much of the content and success of any work. Small wonder is it then that the expedition's stores on the dock at the New York Navy Yard quite concealed our little vessel except for her rakish masts.

The *Diana* was a 400 ton sealing vessel out of St. Johns. Her bow was of solid oak for some seven feet abaft the stem and her enormous timbers reduced the cargo space perceptibly. Her lines were typically ice-riding with the long projecting bow so fashioned as to mount and split the jagged underrunning floes.

"DIANA" AT NEW YORK YARD

Her small but powerful engines were set well aft. With tilted smoke pipe and barrel tops she was true to the type of arctic vessel. Of course ice navigation forbids bilge keels; and northern gales seemed anticipated in the crouch of her bridge which reminded one of a man's shoulders braced to meet the seas. I cannot leave her without a word about her innate fragrance, a sublimation of many seasons sealing, redistilled by the blistering June sun and painfully acute to us effeminate creatures who bathed each morning and paid tribute to Lord Colgate in nine different forms.

At last, as in all narratives, the great day came. Admiral (then Captain) Gleaves supplied us with dock parties and tugs. Commander Ryan broke out his band and rendered routine honors beginning with the *The Girl I Left Behind Me,* and not forgetting to remind us of our destination by *The Good Old Summer Time.* The crowd waved; the movie men cranked; " Leg-go," shouted our down east skipper, and we were off.

> . . . . Off to the Ends of the World, to the edge of the day and the night,
> Where a man may live as the first Man lived,
> And just to live is a fight.

At Boston we took on eleven tons of pemmican, man and dog. This is a mixture of nearly equal amounts of the best rare beef and pure suet mixed and pressed into air tight tins. The latter when sealed are subjected to a roasting temperature just long enough to break down the fleshy tissues and allow the grease to permeate the meat. To the man pemmican was added a small amount of raisins to offset the constipating effect of the large quantities of tea we drank. The nutritious value of this food is very great and strange to say men do not tire of it. A pound a day was the allowance and together with one pound of army hard tack formed the field ration for one day. In addition we boiled tea night and morning.

We hoped to make more of the dog-biscuit of which we took on seventeen tons at Sydney, Nova Scotia. But the dogs never learned to relish it. We also coaled at this port and filled not only the hold bunkers but the waist deck also. The *Diana* now seemed dangerously low in the water but we were consoled by the greediness of her boilers which lightened her inches on every day's run.

Between Newfoundland and Labrador Belle Isle Straits flood ceaselessly to and fro. This to-and-froness is the only poetic thing about them. Fog and ice, reef and wind and tide there await the incautious navigator. In self defence I mention the fact that we were on a chartered ship and entirely helpless in the matter of her piloting. But we had confidence in our captain and sang and made tea in cosy security that crisp July afternoon in the Gulf of St. Lawrence as we rested from our day's toil of restowing cargo.

The captain joined the mate on the bridge and we could hear bits of a shouted conversation. We discovered the sad truth·

early: the mate was very deaf in his starboard ear and could see only indistinctly with his port eye. We tried in vain to replace him, but were assured that his knowledge of arctic waters had become a sense in itself which rose above the assistance of common eyes or ears. This the captain must have believed, for, in spite of the mist which hung over us, and the ice-bergs we all too narrowly avoided, and the rapidly rising gale, the captain saw fit to go below and refresh himself with some Jamaica rum we never knew he had until the trouble was all over.

As sea-going men MacMillan, Small, and myself went on deck from time to time to see how things were going. We turned in about eleven just abaft the deck house where the atmosphere was less dense than in the little close cabin below. About seven bells I was aroused by an altercation on the bridge but dozed off again when I recognized the captain's voice. He was accustomed to while away many a long hour by arguing with the cook or mate or helmsman, whichever of them was willing to oppose his views on politics, religion, or the fish market.

My next impression was a crunching shock followed by a sensation of going down in an elevator. A moment of dead silence followed. Then from the mate, "hard up, —— —— you! Hard up!" in a kind of rasping scream.

He was hard up all right, and hard on too. The ill-fated *Diana* had mounted some hidden ridge and then toppled over until her bulwarks were awash. But more dreadful than the rocks under foot was a looming shadow which threatened our port bow. It seemed to terrify the men. "She's a turnin' now," I heard one gasp, and did not understand the fear in his voice until in the Baffin pack I saw a million tons of ice tremble, topple, and crash furiously into the sea. Had that man not been mistaken I might never have written of his hysterical apprehension.

"Where's the captain?" demanded some impatient member of our ill-fated expedition. A burst of orders drowned him. "Why don't you back her?" It was the mate in a state of growing courage which his anger at everyone else seemed to bring him. He was answered by a roar from the engine room hatch where the fat chief's bald head showed in the darkness. "Ye blind old fool, ye've capsized me whole b'iler with yer rottenness! Back her yerself, and be damned to ye!"

In the darkness and confusion no one saw the captain; but we *smelled* him the moment he arrived. The rum had done its work. He only chuckled and remarked tipsily: "It'sh a bit o' lisht she has, ain't it?"

A tumult of shouts came from the forecastle. All hands were up and several had lit lanterns. Everyone carried a bundle. They were a docile enough crowd ordinarily; now they seemed possessed. This madness included even two of the officers. They were cutting something adrift. I looked about for someone still sane and found the third mate.

"What in hell are you doing?"

"We're sinkin', sir; we're a-goin' down."

I laughed at him. "We're already down as far as we can go," I said. It was as if I had shaken him. He stiffened in his intensity. "No, no, sir; that's just it. It's the same as the *Weymouth*. She slid off the reef, the berg split a-top of her, and they was all lost."

A scraping clatter on the skid frames interrupted him. He leaped clear of a line showing black by his flickering lantern. A large object shot overboard with a great splash. It was our sailing dory. She dived, struck the reef nose on and floated crazily half-full of water.

The truth was that the crew thought we were on the Newfoundland side. Many a cousin, brother, and son had they buried between the surf and the ledges of that vicious shore. They were panic stricken and would have abandoned us to our fate had not someone inspired seized a shovel and crying, "Float her off!", begun to jettison our deckload of coal. Like sheep the poor wretches followed and before long regained their customary apathy enough to realize that the sea was growing safely calm and the sound of low surf to port placed the beach not far away.

Followed days on end of toil and anxiety. By thimblefuls it seemed we carried off our coal and supplies and equipment to the low, desolate beach. Two fishing smacks and several roomy trap-boats were commandeered and their crews impressed into our service. Luckily most of the fishermen had seen or heard of MacMillan and were willing to take his word for payment. At a critical moment they struck for higher wages, and at the same time some scoundrel produced enough whisky to petrify

our already worthless crew. All would have been lost had not a small Canadian customs steamer, the *Stella Maris,* been passing at this time. She kindly (bill came later) came to our assistance and finally pulled us off. We had saved most of our belongings but the *Diana* was valueless and her men demoralized. But we had much to be thankful for. Had any but the calmest weather filled those fifty hours we should have lost every stitch and stick we owned. And the miracle is more amazing when one knows the treachery of that storm-ridden coast.

We limped up to Battle Harbor, twenty miles north. The skipper was very sober and the mate now entirely deaf to all comment. "It was them iron bindings on th' dog-biscuit cases what done it," he confided to me. "But she'd never made it, never. With her deck load she was loggy. I ain't in me whole life seen nothin' like it, never. Never. . . . . " and had he added a "more" he wouldn't have been so unlike the Raven . . . . there with his dark peaked face and bedraggled appearance. . . . . And what he said seemed all true in the minds of those forward who to our surprise gladly forfeited a summer's pay to be free from what they considered an overladen ship.

Take heed you who would sail out of the trade paths of the sea. Load *Confidence* with your cargo. The *Diana* had temperamental pessimism on her bridge. A stevedore strike had left us with a poorly stowed hold. Deck loading was necessary. It became the cue to complaint, the cause of sorrow, and ultimately —as we learned from the assistant engineer who had it at the scuttlebutt—the real reason for our grounding.

At Battle Harbor we received a radio to the effect that we must come to St. Johns and explain ourselves to the *Diana's* owners before they would let us have another vessel. She leaked badly and so far as any of us knew her bottom might drop out at any minute. The crew steadfastly refused to budge.

But we did go. We patched her and took a chance. Three vile days at sea came next, then a maddening delay in St. Johns where we must entirely recoal, reman and refit.

Our next venture in steam sealers was the *Erik*. She was more roomy than our first craft but old as the Ark and of motive power nearly as obscure. I cannot describe her without involving Newfoundland history from St. Anthony to St. Johns, for in that stretch of coast lives no family who within the past three generations has not contributed to her personnel.

On August 1, we put out of the long bottle-shaped harbor and set our course once more to the north. On this day we were due to be at Cape York, two weeks behind schedule already! The North will not wait; it must be entered when the icy gates are open. When they shut winter falls with awful suddenness and intensity. We must win this time, we felt, and rejoiced to be once more on our way.

Four days later we left Battle Harbor. The night before we sailed we sang hymns in Dr. Grenfell's house and otherwise enjoyed this last taste of civilization. Next morning while we were unmooring the inevitable drunken sailor was on hand to see us off. Tom Somebody had obtained a bottle of gin and marched about our decks steeped in maudlin sorrow that we were going away never to return. Finally we managed to inveigle him back to his own ship, the *Southern Cross*, long famous in the annals of arctic exploration. Poor fellow; his concern for us we well remembered when later we learned that in the following sealing season the *Southern Cross* went down with 176 souls aboard including Tom.

Labrador has been termed the Norway of North America, partly in exploitation of the steamship lines which mother its fishing colonies. But the resemblance is about as close as in most other cases of our fatuous nomenclature which too often has been the combined result of alcoholic remorse and nostalgic melancholia. More northern inlets are guarded by high cliffs and lofty plateaus but glacial desolation is too recent for more than a semi-arctic beauty. In geological yesterday huge ice-harrows leveled the upper areas of our continent, and receding left devastation like a war plague in their path. To-day the flattened muskeg reeks of earth gore and the hollows between the ground-down hills are weltering shallows of lake chains. Instead of maggots even more dreadful pests of savage black flies and virulent mosquitoes beset the traveller who dares intrude. Some rugged souls go up there in the summer months and take their salmon at the icy headwaters of Hamilton Inlet, or trade with the Southern Eskimos at Nain and Okkak. But one and all they return and catalogue their perils for our morbid delectation; and occasionally, like Hubbard, they never return.

There are three classes of inhabitants in Labrador, and I cannot say which is the lowest, for all are dirty, ignorant, and

disconsolate. The Nascauppees are real Indians and dress in blankets, moccassins, and no breeches at 60° below zero. The Southern Eskimos die of tuberculosis and leave their savings to the Moravian Missions. The *Olivias* are the wretched white settlers so called from their apathetic answer to any sympathetic inquiries about their plight: "I-live-here" (Oi-liv-ia).

We set our course for South Greenland. A five day gale with fog and sleet made navigation difficult and life a little gray. But the evenings lengthened as we increased our latitude until there was only a twilight at night and ice-bergs could be dodged with a reasonable degree of safety.

Our first view of Greenland was memorable. For days we had tortured our lungs with damp, raw fog. On the thirteenth of August it thinned. Suddenly the sun blazed out red like a fevered eye. It bore due north; the clock pointed midnight. Along a fiery horizon rolled the great flaming disc. Gradually the mist dispelled. The sky was gloriously full of crimson, green, and violet; and the sea blue-black by contrast. One by one huge glistening bergs grew out of the vaporous distance, and like monstrous marble mile-stones, marked our perspective down to the distant shores which finally were visible.

Ice, endless ice, they were, with here and there jutting sienna nunataks like brown plums and burnt citron in a white iced cake. Mounting shimmering into the sky was the limitless expanse of the wind-dimpled ice-cap forged in massive lines by winter blizzards yet with viscous insistance oozing down into the sea. Miles away as we were, we still could hear the dull thunder of calving bergs and occasionally could see the birth of one of those mammoth islands of ice. Here and there a seal porpoised. Northern gulls dotted the sea like rice. The air was now clean and crisp. So beautiful, so beautiful! but oh, how coldly so!

Next morning we made Cape York, the southern limit of the Whale Sound tribe of Eskimos. It must be understood that of the thirty odd thousand Eskimos alive those in Alaska, Labrador, Hudson Bay and South Greenland are more or less in contact with civilization. Since traders reach them or they reach the traders they are not so independent as the few tribes in the northern archipelago and Barren Grounds who know the white men mostly by tradition and count in no way upon outside assistance. Fire arms they know not; and such implements of

hunting and of domestic use are entirely original and created with the scanty resources at their command.

The little tribe with whom we intended to live belonged to the unspoiled type. Early British expeditions reported them savage and treacherous. It is possible that this was assumed after several centuries' experience with the North American Indian; and an Eskimo is inclined to do as he is done by. Peary, however, gained their confidence and fairly won their friendship and admiration. They speak of him as "the white man who never lied"; as "the one who was always ready to work in the morning"; and as "he (the white man) who dares come back." He found them child-like and often unreliable, but usually honest and loyal, and capable of work and hardship to an incredible extent. Endless generations of the fight they wage for existence has made them almost perfect in the art of arctic travel. Peary cleverly recognized their value as assistants, thereby out-doing his predecessors until he finally reached the Pole.

Long before we could make out the *tupiks* (skin tents) up under the cliffs three snaky kayaks darting in and out among the placid floes rushed to greet the ship. MacMillan braced himself on the bill-board.

"Ah-gei-teq, Ah-gei-teq, O-meak-suaq-mut!" (Come out aboard the ship.)

"Ah-shu-daq; Shein-ak-sün-naiq!" (Of course we will. How good it is to see you again.)

One caught our heaving line. He came bounding up the side like a monkey and shook hands all around, white-man fashion. He was short and round and brown. His fat jolly face and long Indian hair shone with grease and perspiration—the thermometer was nearly 35° F.! Somehow he reminded me of Bud Fisher's Jeff after a shave. He gave an impression of short-legged fatuousness which welcomed any imposition. The first was the cook's, who from the rear poured ammonia on him in order if possible to mitigate the poor barbarian's pungent unwashedness.

Kiotaq sprang away, but not in anger. "Tesaq! Tesaq! Climiutsiut imuk soalooq!" (Stop it! you make me smell like dog-water.) And his roars of laughter were turned with ours upon the cook who had more meanness than manners.

MacMillan quickly learned the news from Kiotaq. Time was precious and we must pick up our new men. It was with a

curious thrill I listened to this ancient language which never has acquired the abstract, and calls love by the act it implies; and for hatred substitutes some definite cruelty. In Eskimo I do not hate you; I say that "you are a man whom I may some day harpoon like a walrus, the devil not preventing me!" The smooth deep syllables of the speech pleased our ears. Expressive intonation made unintelligible words full of significance. *Tah-wah-neq*, for instance, means distant. The measure of the distance is expressed by repetition and inflection. Great distance is *tah-wah-neq* uttered many times in low but increasingly highly pitched tones which in the end leave the listener convinced of the unspeakable magnitude of a journey to the place in question, and connotes all the weary miles and impassable ice-fields in between, with starving dogs and torturing snow-filled gales. So picturesque and expressive is all their spoken intercourse that long before I learned the language I loved to sit and follow the rich realism of Eskimo conversation. Phlegmatic as the native is in the face of peril and hardship, he loves few pastimes better than to give himself over to a tale of chase and kill wherein he can fairly forget himself in a fervor of dramatic narrative and description.

I learned most on the sledge trips. Days when I have lain storm-bound in a snow igloo I have waited like a Quaker for inspiration to strike one of the hunters. Faintly through the thick snow walls would come the throb and the hiss of the blinding crushing storm. Occasionally a shivering dog took his nose from out his protecting tail and wailed a long, wolfish complaint against the bitter cruelty of cold and hunger. "That dog's song," begins Egingwaq, "brings before my eyes-no-longer-young the passing of the third moon of the second sun after full ice last ran to Ak-pan-eq. Long, long were the sleeps which came; for Innuit greatly hungered are not noticeably beyond the teams which lie weak and await death."

"My brother's babies fell ill. I think in their hunger they cut seal skins, which we must eat, in pieces too large. Ootaq, the greatly *Angekoq* came. He sang like yonder dog. Spirits unseen to us fearful wretches came to the igloo's front. With them he communed, singing the while strange chants unlike those conceived of human voice. Our last *kioq* (meat soup) went to give him strength."

"He ceased. 'Thou art to be happy,' said he, 'for all thy misery.' . . . . 'Go forth into the night. Go, and follow not any trail of whim or memory. Listen well for the hunger cry of a dog whose voice shall be my own. . . . .'. No more had I from Ootaq; but a coil of excellent *aglunaq* (sealskin line) gave I him in gratitude."

"Out to my skeletons of dogs I staggered and hitched them to my sledge already cut short for weight. Into the dreadful darkness of the night I drove and the low thin moon showed me many flying spirits in the gray vapors of the black leads. One evil fox jeered me."

"Suddenly from the ice came a cry. My dogs whimpered; I trembled. It was Ootaq's own voice but surely from the throat of a dog. I hurled my long whip into the King. He screamed with pain. A great ways we followed the Thing. Twice around rolled the moon then hid under the edge of the world. But still I pursued the voice of Ootaq in the throat of a dog."

"Little more can I relate, for a kind of *Pibloktoq* (hysteria) came upon me. I know not when I saw first the great she bear and her three cubs. I slew her madly, driving my lance clean through her blood hot heart. I ate the heart. My strength returned. Before the great star had crawled half around I was home. Two seal igloos I crossed. One fat seal I added to my load of bear flesh. I entered my stone house and rejoiced while all fed. But Ootoq had not reached his son's camp whither he had gone. On the contrary he drove up into the *Sermilksuaq* (great Inland Ice), became a *Klavitoq,* and now dwells in the second crevasse in the long glacier to the right of Silwaddiq (the Sea Pigeon Cliff)."

All the tales were not like this. In fact every one was different and each had its touch of mystery, while none was lacking in action and climax; and all of them held me to the end for what of happiness or death might follow. After a particularly long and stirring recital it was customary to start the little kerosene or blubber lamp and put the tea pot on for a mug up, and over our mild brew discuss the bewildering ways of devils and the creatures they animated.

With something of this spirit we joined Kiotaq at tea before he left the *Erik*. We then noted that in the space of a short half hour he had gathered bits of wood, nails, bolts, broken knives

and buttons until the hood of his shirt in which he carried them bulged like a junk bag. He piloted us out around the Cape as we stood up toward the next settlement. Every time we crossed an ice-free lane and aimed for the farther edge he hung to anything within reach and danced in an ecstasy of combined joy and apprehension for the collision. Each floe we crashed upon and split drew from him ejaculations of relief and glee. "We do it just like the biggest devil," he declared after each victory.

He was loth to leave but we gently bade him take to his native canoe and helped him overboard. He sprinted away with never so much as a glance over his shoulder. He was hastening to the huddled cluster of figures we saw far back and up on the talus slope where the two families living there awaited their first news of the white man's world. For days thereafter the old man would relate to them every gesture and word of the strangers, and describe in minutest detail each mystifying feature of the huge boat which "pushed itself."

Our next port of call was Umanak in North Star Bay. I give the Eskimo names not of settlements but of settling places. In the whole tribe there are about thirty-five families; these lead an entirely nomadic life. Rarely does a hunter remain more than two seasons in one spot. Game of course is the deciding factor, not so much its quantity as its kind. North are the bears and the caribou. But the Innuit tires of their lusciousness and longs for the juicy narwhal and rancid walrus. South are the seals and the small game, but men must have bear skins for their breeches and caribou skins for their sleeping bags. And besides all this "what pleasure," they say, "is there in the endless company of one whose stories have all been told?"

So they wander back and forth as the years glide by; but always are the stopping places the same. These are protected spots usually at the foot of southern exposures, where a heavy talus is a source of soil and the bird cliffs above are responsible for the necessary fertilization. A handful of stone igloos and as many tent rings of small boulders mark the habitations, many of them hundreds of years old. We found some whose age was to be measured only in geological time, their walls having been filled by glacial till or the silt of a glacier's stream due to the advance or retreat of the ice. Others lay half in the sea their foundations having rested upon land gradually submerging.

Umanak (the Heart) is so-called from the shape of an isolated table of rock which marks the fiord's entrance. Several families had their tents on the low fore shore. Our plan was to pick up the hunters as Peary did, transport them to our base and employ them and their teams not only in helping us procure the large amount of meat necessary for our host of dogs but also for much other irksome labor such as the handling of coal and stores in which we were sadly handicapped by our small number. Strangely enough they never shirked the grinding hardships of cold and hunger and yet shrank from many useful routine tasks at home which in their primitive code belonged to the women folk.

This division of tasks is an index to the tribal culture. I have seen Nucarpingwaq shiver for hours in fruitless endeavor to capture a seal he knew was too small to pay for his trouble; and on his return sit in chaste complacency while his diminutive wife risked her life to carry huge lumps of fresh-water ice across the tide torn ice foot in order that her lord and master might have tea. And he was a good Eskimo, an expert with his harpoon and whip, and proved one of our most valuable men. He came to me one day and said: "I'd like to visit the white man's land. I think I might as your *Nalegaq* (leader) choose men and gather much meat for the voyage. But we have no wood and such a boat as I might build with lashed bone and sewn skins must founder in the great seas you tell me of. Is it not so *Kablunak?*" .... Such is the tragedy of living a thousand miles beyond the tree line.

But there was nothing tragic in the happiness we saw that brilliant arctic morning we left North Star Bay. We had shipped two men and of necessity had included their dogs and women and children. They were all children though in their rapture. Some lay flat upon the grating of the engine room hatch and gasped in fearful joy while the Great Spirit of our engine thumped and wheezed away at his work. Others in continual peril of falling overboard craned their necks over the taffrail for a glimpse of the ship's strange green tail which swished round and round untiringly while the Kablunaks filled its hot belly with coal.

With the help of the natives aboard we found four other camps of from one to five families each. We had no time to anchor but dropped our boats and canvassed dogs and men for the kind we desired. Instantly they were named, father and mother and chil-

dren would knock down their tents, gather what rotten meat they had on hand and pile aboard.

No hunter has less than a dozen dogs and many have several teams, counting the puppies. These must be driven snarling and yelping into the boats and hoisted bodily aboard, a struggling, shrieking mass of fur and bloody fangs. I don't believe the average tenderfoot could distinguish between an Eskimo team and a pack of arctic wolves fresh from the kill. We fenced off a pen amidships but soon found that the hundred dogs could fully command the cargo well which ran between forecastle and poop on the

WEHARKA (THE LITTLE ROCK)

main deck. No one but Eskimo drivers dared enter this area. The furious pack set upon anyone who came within reach unarmed. I don't know why they were in such a vile humor, but they grew steadily worse and set going a continuous battle-royal among themselves, which for a time threatened to exterminate all except a few king dogs. After a day or so the helmsman going on watch learned that he must either go down through the fire and engine rooms in order to reach his station at the wheel or else climb the foremast shrouds and slide to safety down a main backstay. The cook demanded an escort which was enlisted from our Eskimo boys who thoroughly enjoyed the white man's timidity.

By the time we reached Cape Alexander the *Erik* looked like a scare-crow and smelled like Swift & Company's fertilizer plant on a July afternoon. Rigging, skids, sails and decks, were filled with a vast conglomeration of skin kayaks and tupiks, harpoons and lines, dog harnesses, sledges, furs and a million other articles; including of course a considerable amount of rubbish such as broken oars, ancient mildewed sails, blubber-soaked blankets and other relics of Peary's last voyage, all of which constitutes the Eskimo's worldly wealth.

In Whale Sound we stopped several times to kill walrus. Herds of them lay basking on isolated floes in the pleasant August sunshine. Our whale boat could approach within 25 yards if the oars were muffled and sufficient care taken to cease rowing when the bull on watch raised his head. Quick work with our repeating rifles often brought down more than we could take back to the ship. However, in all our killing we endeavored to confine the slaughter to absolute necessity. Musk oxen were the most difficult to handle, for they refuse to leave their dead when brought to bay, and several times we were forced to clean out a whole herd in order to reach the several which were to save the lives of our hunger-stricken dogs. On the other hand many a time did we pass large bands of musk oxen without even disturbing them with our cameras.

We got one bear about this time near Fitz William Island. He was strolling in and out among the rocks when we sighted him, apparently looking for a shady nook in which to sleep off his recent meal; his stomach, we found later, was crammed with undigested seal meat. A boat party landed to leeward and surrounded him. He seemed very small after walrus, which weigh full grown from 1000 to 3000 pounds. He was no runt though for he measured about 10 feet in length and gave us reason to feel that with the other kills we had a fair start on our fall meat supply.

* * *

At about 75° N. the Greenland coast swings to the west forming huge Melville Bay which terminates in Cape York. Ellsemere Land opposite trends east. Together the two coasts form a long, flask of which the neck is Smith Sound and the flask Kane Basin. The latter connects with the Polar Sea through Kennedy Channel about 20 miles wide and twice as long. Polar ice and glacial bergs pour down into Kane Basin and choke the northern entrance to Smith Sound. But the earth's revolutions combined with a north-

erly tidal set crowd ice along west Greenland shores until the current is deflected by Melville Bay and again by Wostenholme Sound, where the crashing grinding masses are carried across and down the western side of Baffin Bay.

So it is that once clear of Cape York a vessel may cruise freely until the great jammed pack in the upper reaches of Smith Sound is met with off Cape Sabine. Around this point swift tides carry the ice stream clear of the land but create a dangerous sector for the most powerful craft. Average pans are from 7 to 12 feet thick. When impelled by powerful current and wind they prove formidable enemies and must be met by diplomatic retreat if there seems any likelihood of a jam. The *Proteus* met her fate here. Colwell reported that she sank in less than 40 minutes after being crushed. Just across the way the *Polaris* surrendered to the pack's relentless pressure. I recollect that some wit among her crew sold her to an Eskimo for a dog team while she lay a wreck upon the floes. I suppose the native had visions of his igloo replaced by a towering edifice built from this gold mine of material. In the night a shift of wind opened her support and she went down before the eyes of her last owner. He marked the exact spot with a sealskin float and to this day his grandsons boast of the family's proprietorship, ... the only kind of ship they have.

The expedition prospectus had defined our course through this danger zone and on up into Flagler Fiord which, we supposed, broke out every year. Twice had Peary traversed its outer waters and more than one English expedition had steamed easily about the adjacent shores in Hayes Sound. But in all three summers I saw the place not once could a vessel have penetrated the massive bergs and pressure ice which barricaded its entrances. This lesson of the North has been cruelly learned: one season or two, or even three are never a criterion of ice conditions in any other seasons. This mistake cost Greely the lives of 19 of his men. They steamed far north one year and concluded that Hall Basin must be free every summer. Franklin measured his future by reports upon the past and lost two vessels with 149 men in their crews. Peary knew the truth of arctic inconsistency only after dreadful sufferings from which he escaped by the most incredible good luck. Fortunately for us we could not get in; had we done so, goodness knows when we ever should have got out again.

But we certainly tried hard enough. Time and again we slid out of trouble by inches while the ice spun on in its mad dance as though enraged by its helplessness. In the lookout barrels the captain and MacMillan took turns in conning the ship. When a fairway opened out we hastened full of hope to reconnoiter it. But always in vain. We did our best. We risked the ship and the expedition. But fate in the guise of ice said *no*.

August was almost over. Every night the young ice grew thicker. The little auks were flying south. Gusts of wind from the ice cap became more persistent and carried a bitter threat of cold weather soon to come. We sought some snug hole from which we might best carry out our original plans of crossing Ellsemere Land and striking the Polar Sea at Cape Thomas Hubbard. Foulke Fiord promised easy access to Smith Sound as well as the Inland Ice which was included in our hopes. Two families of natives already lived there and vacant igloos for those whom we had enlisted solved a difficulty we had dreaded since losing some of our lumber in a gale on the way up.

It was manifestly impossible for us to provide shelter for all the natives. On the other hand we disliked to have them feel at the outset that we were incapable of proving their protectors. That in the beginning was the great lure to join our service. A ship load of food and ammunition assured every hunter we took that his babies might blink at the next spring sun over chubby well-filled cheeks. Men and women alike dread famine first and last for its effect upon their children. Yet we knew from past accounts they could not abide by our laws of physiological regularity nor could they subsist comfortably upon a white man's diet of carbohydrates. Protein gluttony was their heritage. Evil spirits might now play havoc with the ice and weather until hunting were impossible. So long as we were there no Eskimo would go hungry. They well knew this. They believed too that we should be delighted to have them live with us. But for convenience sake they took the igloos, relieving greatly our first forbodings that we might sacrifice what little comfort and seclusion we had to a winter's confinement among two score vermined oil sponges.

We established our base at Etah (the native name for Foulke Fiord) with all possible dispatch. Deep water right up to the rocks permitted us to moor alongside and disembark the greater part

of our cargo over a temporary staging. We slept very little those days. Many an arctic expedition has come to grief at this critical time when the slightest turn in meteorological conditions may postpone everything indefinitely or even compel the party to seek some new refuge. Fuel and provisions must be put ashore. Fire or ice or grounding may eliminate the ship before her cargo is even on deck. Amundsen fought fire. Fiala's hut lights went out; when he opened the door to investigate, the ship to which his wires led had disappeared, swallowed up in the ice frenzy which swept suddenly in from the sea. The *Advance* under ice pressure fought her way wildly up the rocks as though in terror at the insane fury of the following pack. We labored with these examples in mind.

Every box, crate, case and parcel had its distinguishing mark and symbol. The symbol indicated to which department the contained article belonged: a cross meant field gear; a crescent scientific; a disc headquarters equipment; and so on. The mark was a letter initialing the particular branch of science or equipment and a number referring to lists which the head of each department held for his own portion. This marking enabled us to sort out a great number of pieces with rapidity and accuracy. Later when excavating a case in blinding drift and no other light than a hurricane lantern we appreciated the value of this system. Also since the color of symbols bore some significance upon the contents, our Eskimos quickly learned to pick out almost anything we needed.

Speaking of cases of supplies jogs my memory. At this time we were all unconscious victims of a most outrageous delusion. Not one of us was there who had not repeatedly blistered his fingers in the biting wind which howled across Provision Point, the granite ledge where we had stacked our orderly piles of casks and boxes. Jot Small proved an exacting master of the pantry. In his capacity as cook we left largely to him the choice of our menus and their integration towards a balanced diet. He issued morning orders to the one of us who stood the regular watch from midnight to 8 a. m. (We kept a watch the whole time north for taking observations, looking out for the dogs, and guarding against fire.) If it were a barrel of beans he desired the unfortunate watch stander must begin some hours ahead. Next came a spell of pick work, and finally a heavy iron maul or crow bar was necessary to loosen the mass of ice and crust which formed over everything and cemented it to the rocks. This task would not

have been easy under any conditions; but in a violent spray of rasping drift snow and shrouded by utter darkness it became a job we dreaded more and more as time went on.

Jot was called at six. One took a set of readings at the same time. Inevitably the fire burned down meanwhile. "How do you expect I'm agoin' to do anything by thet smudge?" He had the real Cape Cod twang which Thoreau ascribed to fish diet and fog. "Where's them beans?" He never saw them even if they were in. "Why ain't you filled thet coal bucket?" his voice rising a grade on each complaint. The fact that we were supposed to be scientists and scholars never daunted him. I believe he truly delighted in ordering us about. We put up with his idiosyncrasies because he could cook. Such bread and hot cakes as he could make! We used to dream about them on our sledge journeys. And he was resourceful. Cook books call for many things which arctic expeditions must forget ever existed. Fresh eggs and milk are fundamentals in nearly all recipes. Yet I never saw Jot stumped in all the 400 pages of the White House Cook Book.

Our satisfaction was short lived. Jot got toothache, and his long patrols on the weather side of Cape Cod had laid the foundation of a rheumatic old age which in the polar north needs but the barest hint to ravage a man's happiness. In his little board bunk he groaned. His tobacco supply fell to half of what he was accustomed to. He went down into his chest and brought out his contract and studied it over all one evening. Next morning he announced that he was done with cooking. "I ain't agoin' to cook any more 'n my share. 'Tain't in the contract!" he declared. For two weeks we took turns arguing with him. But he hadn't sat around a life saving station stove for nine years for nothing. We never convinced him. After that he did one-seventh of the cooking and not one flapjack more.

By October we were pretty well settled so far as living quarters were concerned. The little shack we had built on the beach was a great success. From the Eskimos we learned what winds to expect and frequent northeast gales proved their information correct. On the weather sides we piled all our empty crates and rubbish of every sort. In the space of a few days a huge drift had formed which was not only an efficient buffer against the violent attacks of fall storms but also an excellent insulator in conserving the heat of our precious coal. The walls were a double thickness

of tongued spruce with a 4-inch air space between and the whole covered by rubberoid roofing material. The structure was low and solid and well designed to meet the fierce onslaughts of the violent winter gales.

Up to this point all hands had combined. Building, storing provisions, unpacking and arranging equipment, and all the other details of establishing a base had engaged the attention of us all. The work now divided itself into three parts, all preparatory to the winter's campaign. First in importance was our corps of assistants. Already we had enough drivers and hunters for preliminary parties. But for the main expedition across Ellsemere Land and north we must hire about 20 Eskimos and by short sledge journeys under the command of white leaders acquaint them with our methods and routine of travelling.

With this in view MacMillan left us as soon as possible to make a complete round of the tribe in order to choose additional men and promote a friendly spirit toward our expedition. When one considers that more than 600 miles of glacial coast must be scoured for igloos the magnitude of his task is apparent. He carried on his sledges some small presents and other substantial inducements to further intercourse with us. We had a large supply of kerosene and plenty of small single and double burner stoves. These were a great boon to the natives. Ordinarily they must camp after a hard day of hunting and travelling without any prospect of hot food for several hours. A snow house takes an hour to build and the primitive blubber lamps twice as long again before even water could be boiled. With a tin of kerosene and one of our two-burners tea and meat could be prepared in the shelter of a snow-block wind-break at half an hour's notice.

News soon got about that we were inmmensely wealthy and infinitely generous. Visitors began to arrive in the October moon. "Komotik coming" was quickly caught by the youngsters, and scarcely a day passed by without a screaming chorus of joy culminating in the "Komotik coming" cry. This business became a little embarrassing as time went on and our "open house" became better and better advertised. Some came out of pure curiosity; but most of them included mercenary motives which were never very deeply concealed. All brought skin, lines, dogs and meat until our storeroom could hold no more. One man was so delighted with the sweets and bright cloth we paid him for his dogs

that he sold them all and then naively asked us to loan him several of them in order that he might return to his own home.

At MacMillan's suggestion each white man formed particular friendships among the visitors, in order that those of us who should travel might live for a time in native style and assimilate so far as possible the habits and tricks of Eskimo life. Our system involved a deliberate descent to primitive existence for the purpose of mastering such arts as dog driving and building snow houses.

AKATINGWAQ AND AHTETAQ SHOWING WOMEN'S COSTUME

Sipsu took my fancy from the start. He was stocky and lithe, reserved but alert; and clever beyond many of them older than himself. Four children, a wife and a mother-in-law depended for their living upon his skill with harpoon and lance. He taught me to build a snow house and start a native lamp with moss and blubber. He explained how one must trail and meet a bear, first in his autumnal satiety, and last in the fierce bloodthirstiness of his spring famine. By watching Sipsu I came to understand the care of my feet—vastly important in

the bitter nights and the long marches. I observed his dog discipline, and practiced my whip stroke in imitation of his own. Detail by detail I mastered the unwritten lessons which every Eskimo boy must learn before he dare go abroad amid the treacheries of cold and wind and darkness.

Each white man took his course. It was not easy; rotten meat and vermin could not go easily with ten centuries of culture. We stuck it out though and thereby bought our lives as later experience showed us. By December four of our party were fit to take the trail for serious work.

In the meantime some were always at the base. Arctic exploration is too uncertain to permit procrastination. "Do it now" became our slogan, our doctrine, our religion. Storm, fire, sickness, or any one of a dozen other disasters might as in past expeditions at any moment wipe out every particle of progress we had made. Our time was limited, our supplies were none too plentiful, and we could have employed seventy men where we had but seven.

We erected our wireless and electrical plant. The weights were a nightmare for days before we managed to get them up to the house level. Then came the labor of unpacking and assembling. Every one of the four score storage batteries must be inspected, overhauled, repaired and connected up. After all they had undergone in shipwreck and rough handling this job was a pretty tough one. Charging took a couple of days which were real reliefs after the struggle with engine and generator.

Allen wired the house. Incandescent lamps were strung under the close scrutiny of the Eskimos. We told them to stand by for a treat. The switch fell in. "Ah-h-h! Taku-u!" Such a shout they gave. The sun gone twenty days seemed to have returned.

"How do you imagine such a thing is possible?" we asked one old man who stood gaping.

"The little cords (wires) must be hollow," he replied, "and carry oil which becomes very hot in the glass bladders (globes)." He seemed confident he was really giving us a clue to the miracle.

After the electric lights indoor work went on with greater facility and content. It is well known that while the human being is not exactly heliotropic he is very susceptible to solar influence and possibly for the same reason unconsciously reacts

when light is increased. At any rate there was a marked progress in music and repartee which are very good spirit indicators.

We fitted up a scientific workshop and put all of the recording instruments in proper working order. The thermometer shelter was anchored in an exposed position and filled with an impressive assortment of thermographs, barographs, psychometers, and every other form of mechanism designed to investigate and record the subtlest variations of our unsuspecting atmosphere. Similar substations were commissioned at commanding points on the neighboring plateau which towered over us some two thousand feet and extended several miles along the inland ice to where another station stood. This was done in order to compare meteorological data for different air movements. It was curious to note what a difference the direction of wind made. Air pouring down from the frigid wastes of the Great Ice divided above our camp into two icy torrents. One stream swept through the fiord in all its pristine bitterness. The other deflected by irregularities in the plateau fell almost vertically two thousand feet and by the increase of pressure was heated adiabatically a very merciful amount. These two conditions were consistently characteristic of all clear weather we had. Cloudy southerly weather was an equally familiar state. Swells under the ice from the open sea far to the south produced cracks among the compact floes which exhausted warm air in great volume. (The temperature of the sea never goes much below plus 29° F.) These hot jets instantly condensed all water vapor within reach and formed immense banks of black low-hanging clouds. This barrier opposed the cold northern circulation and insulated the surrounding atmosphere against loss of the water vapor heat. Warm snowy weather with little wind was the invariable result.

I need only mention the fact that the expense of time and actual suffering sacrificed to tumping heavy instruments over cliffs and glaciers in the face of blighting winds made frequent failures almost too discouraging. After the first year our ambitious program shrank to a more practicable scope, though the records themselves became little less numerous and valuable. This is an important point which we failed to understand at first: it is better to underestimate one's capacity than to overdo and disappoint co-workers whose services are willingly volunteered only so long as results seem to be in keeping with the price.

In building the house an excavation had been made beneath its forward edge. This at first was intended to be a kind of cellar; but when we realized how short of lumber we were, plans for a seismograph house were discarded and this hole substituted. A preliminary survey promised fair results provided that the place were sufficiently warmed for the tedious work of balancing pendulum and shifting grams. As master seismologist I arranged a battery of oil stoves in my dungeon and set them going full blast. I hoped to thaw the soil sufficiently to excavate down to bed rock in order that my concrete pedestal might have a proper foundation. In the meantime I walled in the space with canvas and built a work table for fixing and printing. After arduous picking I managed to dig and to take out a few boulders until I could frame my cement base. Sand and gravel I procured at the risk of my life. Every time I ventured out with the basket or box I was set upon by a million or so ravenous wolves. As their masters carried chopped meat in such a box the dogs of course thought I had come to feed them. Before the door slammed behind me hundreds of shadowy gaunt forms had leapt into life and were charging me full cry in a most terrifying manner. My shouted abuse might stop the front ranks but those in the rear only snapped and tore their way ahead in impatient rage at the delay. After several such encounters I went armed with a stout club and flanked by two Eskimo boys with whips. I even came to enjoy disappointing the ill-mannered brutes.

Meanwhile I was seized with fits of violent headaches and frequent nausea, which I attributed to eyestrain, indigestion and a number of other more obscure causes. But careful etiological examination of my indisposition pointed to the oil-stoves as the culprits; later experience proved this theory correct. In fact more than once we laid out both white men and Eskimos with the poisonous gases which collected in unventilated snow-houses and igloos while we were cooking on kerosene stoves.

Vicissitudes I call them now, all those troubles, but I have a disquieting suspicion that the designation is very weak. Scientific work in a laboratory can be a charming avocation. In a cramped and stinking hole at either freezing or boiling temperatures it is at least a bore. After some days I was ready for the seismograph. I set it up. Alas; the blue prints had given me the wrong dimensions. It was 6 inches too high for the cellar. Dynamite was necessary to alter the concrete base. Other work became more

vital for the time. I postponed the nasty job until after Christmas and speak of it at all only as an illustration of the tasks we faced singlehanded under conditions that made them well nigh beyond the limits of human patience and endurance.

Four of us made ready to travel. The November moon had given us some real experience. Now we must put it to a test. Stoves and harness were repaired, skin garments were mended and refitted. Everywhere was a bustle and busyness that lasted through the 24 hours. Such is the Eskimo method. Everyone work, and when sleep can be put off no longer take it like any other rest, just settle down by the task and sleep. Heavy rifles for bear were overhauled. Ekblaw and I received orders to leave for the north with five natives. Caches for the spring campaign were our mission, bear meat for Christmas dinner our hope. We got away December 5.

(TO BE CONTINUED)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A GREATER FIELD OF ACTIVITY FOR MEDICAL OFFICERS OF NAVY YARDS[1]

By Medical Inspector Norman J. Blackwood
AND
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Those who have watched the development of naval conditions ashore and are cognizant of the advances in preventive medicine, and who are appreciative of the meaning of both, cannot be oblivious to the importance of careful sanitary supervision of yards and stations. By General Order No. 16, March 1, 1906, 1168b, (2), medical officers are made responsible for a watchfulness over those matters which may directly or indirectly be prejudicial to health, and they are expected to keep the commanding officer informed and to guide him in the rectification of existing conditions. In this respect the monthly reports have a definite value as a means of fostering sanitary watchfulness, of keeping the commandant and the bureau in touch with matters bearing upon health, and of continually emphasizing the necessary improvements, but it was not the bureau's intention in recommending, or the department's intention in promulgating, the regulation that it should relieve medical officers of the logical procedure of bringing pressing matters to the attention of the immediate authorities whenever and as often as they might arise or come to notice. As a matter of fact, there should be no delay in seeking to correct a sanitary defect. These matters should not be allowed to accumulate on memoranda and be brought to the notice of commandants for the first time in the monthly reports. These reports ought not to be the month's accumulation of observations, but rather a review of the sanitary work for the month, with a reiteration of those urgent matters which have been the subject of recommendation but which have not been acted upon, and additional recommendations concerning any new matters that may have just come to light. The bureau desires to be understood as wishing to contribute the very best that it may toward the successful administration of every naval command, and, in return, it only asks the co-operation of the yards and stations in carrying out the dictates of preventive medicine.

Success in these aims depends to a great extent upon an understanding and assistance from such sources, and in order to enlist the support of commanding officers, observed sanitary defects within the realm of their

[1] This article appeared in the U. S. Naval Medical Review for April, 1916.

jurisdiction must be brought to their attention, not in the form of a criticism at the end of each month, but as information to be conveyed from day to day, or as opportunity occurs, and conveyed in such a manner as to evince a spirit of good faith and honest purpose. This is the type of official intercourse which fosters a cordial relation and begets mutual confidence. It is a method of procedure which offers greatest promise of attention to important matters and insures the correction of existing defects within the means at the command of this particular authority and according to the ideas of his sanitary adviser.

The above quotation from the annual report of the Surgeon General, U. S. Navy, for the fiscal year 1909, in general expresses our view of the proper principles underlying the relation between the commandant of a navy yard and station and his medical officer. It was written as an exhibit of the bureau's general policy in the hope of guiding medical officers concerned to an effective performance of their duties and for the purpose of acquainting present and future commandants with the desires and aims of the Medical Department. It has been interesting to observe the practical application of what, at the time of writing, was merely a theoretical conception. Briefly, the conception contemplates a broadened field of usefulness for the medical officers of yards, and the manner of its observance and development, first at the Norfolk Navy Yard and now at the Philadelphia and Boston Navy Yards under commandants of quite different temperaments and ideas, has been attended with such uniform success in point of both harmony of action and service results that there is undoubted justification for presenting the details.

Before discussing the various elements entering into the scheme of navy yard service, however, it is timely and proper to make a few general observations.

Nothing that has been or is being done is in default of compliance with the Navy Regulations and Instructions and Manual for the Medical Department, or in substitution for any provision thereof. These books represent a codification, we take it, of the most salient requirements in the interest of uniform action, administrative harmony and service efficiency, but, large and comprehensive as these books apparently are, they do not and should not attempt to, and could not successfully define the duties of a particular office in more detail than is necessary to indicate a course and provide a basis for co-operative effort. Much is everywhere properly left to the initiative and resourcefulness of the

incumbent of that office—his area of discretion—and it is by utilizing the latitude of this area for useful service to the full, quite as much as through any other means, that the possibilities of the office are rounded out, the interests of the service are advanced, and progress is made. There is no need to enumerate all or cite any one in particular of the several specific or general provisions set down in the books mentioned, for these are always available for reference, but we believe we are right in saying that they are not restrictive in the sense in which we are discussing them, and are broad enough to admit of almost any innovation, within the scope of Medical Department activity, calculated to enhance its usefulness as a co-ordinate branch of the navy.

The aim, therefore, will be to show what use has been made of this fact to secure a degree of efficiency in the Medical Department of navy yards, which would express something more than just "well enough," in accordance with the provisions of the U. S. Navy Regulations and Instructions and the Manual for the Medical Department of the U. S. Navy, and to demonstrate the opportunities in navy yard duty for usefulness to the service at large.

It must be recognized that success in this direction is dependent upon three primary factors: (1) An effective organization and daily administration of the medical division, even though small; (2) a thorough knowledge of conditions in the yard and those outside (in the city and its environs) which influence local conditions, or which must be taken into account in bringing about desirable changes; and (3) a type of official intercourse with naval and civil authorities which fosters cordial relations and begets mutual confidence.

The first of these is necessary to avoid the haphazard conduct of responsibilities, and as the basis of an ability to meet all possible demands in the smoothest, most expeditious and thorough manner, and thus to contribute the department's proper quota to the success of the command.

The second is necessary as the basis for an intelligent supervision of sanitary problems and health conditions, and as a prerequisite to the suggestion of sanitary rules or reforms. It would be idle to sit down in one's office and formulate an ideal proposition in any given direction and complacently plume oneself that one's duty had been done. There are various circumstances and considerations which bear upon every contemplated reform to

which one's attempted solution must be adjusted without necessarily quashing its feasibility. If a desirable and necessary advance cannot be made in what seems the ideal way, some at least temporarily, satisfactory alternative can be found to meet the requirements and accomplish the desired ends. It is the medical officer's duty after first acquainting himself with the difficulties and learning the financial possibilities, if money is involved, to exercise his ingenuity in finding a way to make his recommendations practical. One executed reform is worth a dozen filed away, no matter how perfect in conception and necessary they may be, which are unacted upon because of their Utopian impracticability.

The third factor is necessary in order to avoid friction, that greatest of all blocks to progress, and to either give one a free hand, or insure that degree of co-operation which will bring the quickest and fullest results. A spirit of reciprocity must obtain, and an understanding agreement as to purpose must be reached between the naval authorities, or the civil health authorities, as the case may be, and the medical representatives of the navy yard; and it is always possible for a naval industrial plant to do much in the interest of a city's health, just as it is for the city to be of great assistance to a naval community. If a disposition to honest reports and frank dealing exists, almost any situation can be handled and any requirement compassed. In the effort to make the office of the medical officer of the yard all that it may be, his intercourse on all sides should be governed by tact, adjusted to the personal susceptibilities of the individual addressed or dealt with, by patience in the face of inevitable difficulties, by ingenuity in circumventing obstacles, by persistance in the effort to secure results, and by unlimited interest and energy in seeking out and executing beneficial reforms—not in a busybody sense for the sake of reform, but for the sake of the benefit where improvement is really indicated.

Where does the medical department of a navy yard stand in relation to all that goes to make a large naval station, and of which it is a part—not in a physical sense, but from the point of view of helpful service?

On the one hand there are: the other departments of the yard, each of which in general terms is separately housed and employs a greater or less force of civilians—men who live outside, but come into the yard every day to work; the families of officers

residing within the yard and their household employees—for, from the health point of view, it is impossible to disregard domestic servants; the Marine Barracks; and the ships stationed at the yard or visiting it.

On the other hand, there is the adjacent or surrounding civil community, and the Naval Hospital.

We are disposed to think that the medical department of the station stands in a position which is central to all of these, and in a sanitary and health sense is the integrating factor. At all events, there is a very real, though perhaps hitherto undefined relation between all of these elements and the yard dispensary, which can be turned to good advantage; and an analysis of it will display the opportunities and the idea which should animate medical department activities.

First of all, there should be a code of sanitary rules, standardizing and controlling all the routine requirements having to do with cleanliness and health which are inseparable from every fixed community, including garbage, refuse and manure disposal, the care of the stable and the cleaning of toilets, etc. If such a code is not in existence, it should be prepared, either in toto, or by gathering together scattered existing rules and supplementing them in accordance with the needs of the particular station.

As regards the civil force during its working hours, medical department concerns properly overspread practically every department in the yard—both in daily direct service, such as sanitary and hygienic watchfulness and interest in the "safety first" idea, and in its direct professional relief and assistance in the event of personal injury or other emergency. In addition to the extent to which civil employees benefit by the general sanitary accomplishments in the station at large, they benefit by those measures directed specifically at the buildings or immediate locality in which they work, and by the rules designed and vigilance exercised to prevent the spread of contagious or infectious diseases, and to insure a wholesome supply of milk and other foodstuffs. A large proportion of the civil employees buy lunches from vendors permitted to do business with the yard.

As regards families and their servants, and service personnel, they are included in the considerations which have led to the provisions above mentioned, and they benefit directly or indirectly from them. In addition, the members of the various households

on the government reservations and the personnel of the Marine Barracks and other commands, which immediately concern the medical officer of the yard, are cared for in illness and guided in the preservation of health by vaccination and timely advice against seasonal dangers and specific sources of infection. In this connection, the more or less intimate contact of servants with the members of the families by whom employed, and their frequent comings and goings, or periodic visits in off times to localities often of questionable healthfulness, constitute a real danger to the naval community, and exact consideration in the interest of thorough medical watchfulness to see that a contagion or an infection does not slip in unawares and establish a disease which might seriously complicate official interests. Although an important possible source of trouble, they are in the background, as it were, and easily lost sight of in the problem of preventive medicine. When we are really civilized, the health authorities of cities will give practical expression to their recognition of this fact by affiliating municipal medical examiners with every employment agency. The present omission of such wise provision we attempt tactfully to supply to the extent and in such a manner as the susceptibilities of the individual make possible, no official exactions being possible owing to the great difficulties that already complicate the servant question in a place so remote from the center of things as most navy yards.

But it may be pertinent to remark that already, in New York, Boston and Philadelphia, a number of hotels and restaurants will not employ waiters and cooks who cannot furnish a certificate from certain designated physicians as to their absolute freedom from communicable diseases. This practice is growing rapidly, so that the applicants voluntarily submit themselves for these examinations and certificates, before applying for positions. If such advances are considered necessary for the safeguarding of the general public, how much more necessary must it be for us in relation to our domestic servants, who live in so much more intimate contact with our families? How many householders know, or have even taken the trouble to ask, whether their cooks and waitresses are typhoid, dysentery, or epidemic meningitis carriers, or are infected with tuberculosis, syphilis, or gonorrhœa? And yet we allow these domestics to handle and prepare our food and

play with our children, while we sit supinely, and either willingly or ignorantly place our lives or health unreservedly in their hands.

As regards the ships stationed at the yard or visiting it, they also are included in the considerations which have led to the general sanitary conditions and provisions, but, as the personnel of these units is cared for by its own medical officers, who are usually unfamiliar with the general local conditions, and without that special information which is of immediate importance to them in carrying out their duties, they represent quite a different demand.

The medical officers of ships want to know the potability of the water supply; the wholesome sources of supply of milk and other foodstuffs, and anything which affects the general market; the prevailing communicable diseases and their localities; the venereal dangers and other pitfalls, such as the procurability of habit-forming drugs frequently associated with tenderloin districts; the availability of hospital facilities, and such aids to diagnostic precision as the Wassermann test, the X-ray and bacteriological culturing, and the local formalities in procuring these; the possibilities of having clothing and bedding disinfected, and the manner of going about it; the arrangements for dental treatments and the form of certification preliminary to such service; and any other professional assistance the yard is ready to give, together with those sections or paragraphs of the Yard Regulations which pertain to official matters or procedures falling within their responsibilities. This data we give them in circulars or bulletins issued from time to time as circumstances dictate, and supplemented by briefer notices issued to incoming ships, as soon as they have moored and communication is possible.

The medical officers of ships also want to know what opportunities the locality may offer for post-graduate study in one branch or another; to see the professional work (surgical or medical) of its distinguished specialists; to enjoy the benefit of association with its group of medical men; and frequently direction is sought, either in their own interest or that of a patient, to a representative of one or another of the various specialties. All this information and more, we announce our preparedness to give in detail upon the asking, and we see that it is understood that when any information requested is not in our possession at the moment desired, we stand ready to obtain it promptly.

The propriety of the belief that such duties should be assumed by the medical officers of a navy yard is based upon the idea that, as the yard dispensary is a permanent office and properly in constant touch with everything in the locality which is of interest and value in a health, sanitary and broadly professional sense, it should be the center or clearing house for information which it would take any medical officer, undertaking to inform himself, weeks if not months to learn. A medical officer assigned to duty which is less permanently identified with a given naval station than is the yard dispensary, or which brings him within its boundaries only as an incident, has a right to look to the medical officer of the yard for such information, and to expect to be relieved of the time-consuming necessity to duplicate the search that should have been completed long before. Not only should such a medical officer be supplied with the most complete data along the lines above indicated, to help him to rightly advise his commanding officer how to safeguard the health of those under him, and to give him a chance for professional refreshment, but these data, when concerning a topic subject to change, should be kept up to date, and the medical officer kept in touch with local current events or developments through the medium of periodic supplemental circulars or bulletins.

As regards the adjacent civil community, anything that may be done within the boundaries of the government reservation to perfect sanitary arrangements and safeguard health cannot fail to be a most acceptable contribution to the health department of the civil community, because such action makes the navy a welcome neighbor, in that it guarantees that the field in which its citizens labor is freed of menace to their health. Moreover, any reasonable sanitary observance which may be insisted upon by the navy authorities is a practical lesson in the process of educating the public, and operates to strengthen the hand of the city health authorities in securing or winning compliance with up-to-date laws and rules in their own territory.

Again, it is well konwn that, even in the present state of development of the public health conscience, many cities are lacking in provisions for adequate sanitary control of the production or preparation, and the handling of foodstuffs of various kinds, as evidenced by the existence of organizations such as The Consumers' League, and Civic Clubs, which undertake to protect

the consumer in this, among other directions. It is given to the Federal Government to lend substantial support to the better element and higher ideals of the neighboring community from which food supplies are drawn, by reason of the fact that at any one place the government's needs are sufficiently large to make its patronage eminently worth striving for. This is actually the case in practice as well as theory, and the government representatives have but to say that word which will make at once for its own interests and those of civil communities.

It is in this direction, also, therefore, that medical officers of yards and stations may employ themselves to advantage; and the end has been accomplished at Boston and Philadelphia by formulating, either independently or in supplement to existing laws and rules, or in advisement with a branch of the Consumers' League, or other similar organizations, a reasonable standard of requirement in accordance with modern sanitary ideas pertaining to the arrangement, equipment and methods of the establishments of dealers in foodstuffs, with which all prospective bidders must conform to the satisfaction of the medical officer, if their propositions are to be considered and acceptable. With the hearty, intelligent, and efficient co-operation of the supply officer at the Boston yard and the purchasing pay officer at Boston, every proposal issued in call for bids now bears the following stipulation, and no contract is awarded unless the bidder complies with it:

No award shall be made to any dealer unless the said dealer's establishment appears on the approved sanitary list of the Consumers' League of Massachusetts, subject to the approval of the medical officer of the navy yard, Boston, Mass., or unless the said dealer's place of manufacture, preparation, and packing, and all appurtenances and utilities pertaining thereto, shall have passed a sanitary inspection by the medical officer of the navy yard. Furthermore, any and all contracts with any dealer shall be voidable without notice, at the discretion of the Bureau of Supplies & Accounts, if at any time the dealer's establishment is removed from the approved list of the Consumers' League of Massachusetts, or if, in the opinion of the medical officer of the navy yard, the dealer fails to maintain a satisfactory sanitary standard. If a dealer declines to afford proper facilities for inspection, or hinders such inspection in any way, his proposal shall not be considered, or his contract shall become void, as the case may be.

At the Philadelphia yard also the supply officer and quartermaster of marines are co-operating in the effort to secure the added protection of such sanitary requirements by a stipulation modified from the above form to meet local conditions but quite similar in purport.

This entails the work of inspection, but it brings a valuable knowledge of the industries concerned, and promises results that are worth striving for.

As all government contracts specify the ingredients to be contained in foodstuffs, and as every contract for foodstuffs is carefully inspected by an expert before it is accepted, now, with this added assurance that it is prepared and handled in sanitary surroundings and by cleanly methods, we can feel fairly well assured that the food for the men of the navy and those living in naval establishments is all that it should be in quality and hygienic value. But there still remains a loophole for the entrance of contamination, and that is on board ship between the time of receipt and issue for consumption by the messes.

We would therefore like to here interject a caution to the commissary and medical departments of cruising ships, to the effect that all our efforts may be useless, unless the greatest care is exercised in the sanitary handling and preparation of these foods after they have been received aboard. Space does not permit of our entering into details of this matter, but every officer on cruising ships, if he energetically pursues the lines of preventive sanitation here led up to, will undoubtedly find many things to reform, and so contribute to the general good.

Supervision must also be had over the various retail dealers in foodstuffs, especially of milk and its derivatives, who seek to do business in navy yards, either with the residents or the visiting ships or civil employees, and sanitary rules should be laid down, fixing a standard which shall obtain in their establishments in order that they may be eligible to a permit, and controlling such traffic in the yard. It is a reasonable assumption, on the part of ships and others, that supplies sold within the government reservation are safe articles of food from the health point of view, and consequently, there is a moral as well as a sanitary obligation placed upon the yard authorities to see to it, as far as may be practicable, without giving certificate of assurance, that that confidence and dependence is justified.

In addition to these indirect ways of assisting to better municipal conditions while conserving the government interests, there are services of more immediate consequence to both naval and civil communities which can and should be rendered. We refer to the procedure which may be devised, in obedience to official injunc-

tion, to prevent the spread of infectious and contagious diseases and foster the gratifying possibilities of being able each month to report that none of the contagious or important infectious diseases originated within or was brought to the yard. In perfecting a plan to control the danger herein involved, agreement was reached between the cities and yards under discussion, by which each of the pair in juxtaposition would notify the other of its knowledge of any case of quarantinable disease, so that proper action could be taken. The yards' share in this arrangement is met by safeguarding the city from any source of infection or contagion which may come under the jurisdiction of the navy, by the issue of general instructions concerning such diseases to service personnel and civilian employees alike; by the preparation of separate informative circulars, concerning necessary precautionary measures in each of the several quarantinable diseases, which are issued to the civilian employees and any other persons on duty in the navy yard; and who, in accordance therewith, are required to report if one or another of these diseases has developed in a member of his family or in the house in which he is living. This information comes to the yard official either from the interested individual in person, by telephone, or by letter, or from the City Bureau of Health by postcard, and all cases in the families of civilian employees, officers or enlisted men living in the city, which come first to the knowledge of the medical officer of the yard, are immediately notified to the city health authorities by telephone and postcard.

Finally, effort has been made to maintain relations of a cooperative nature between the navy yards and adjacent civil communities—both in the actual work of sanitary improvement, and in the constant exchange of helpful advice and information looking to the abatement of any conditions prejudicial to health. This intercourse, although in some instances by letter, is on the whole free and informal by telephone, or in person, and both parties benefit.

As regards the naval hospitals, much can be and has been done by the medical department of yards to extend the facilities therein represented outside of its immediate confines, and, also, to protect it from unnecessary demands. Both of these services have been accomplished by the dispensaries of the yards under discussion, through their assumed capacity as buffers or intermediaries,

in the one case publishing ambulance schedules and the types and the hours of out-patient services offered by the hospital; in the other case focusing, sifting, and clarifying all demands upon the hospital.

While in the conduct of the medical departments of the yards which have been our respective fields of duty, we have endeavored to integrate the elements of the service on either side, and to recognize our responsibility and render service to both, the hospitals and the ships are themselves not without certain responsibilities—each to the yards.

Each hospital should advise the dispensary with which it has relation, concerning ambulance trips other than those scheduled, and of any changes in its routine of out-patient accommodations; and it should also, as far as possible, make advance announcement to the dispensary of operations to be performed, so that visiting medical officers may be given opportunity to attend. The question of whether or not such information would be or is made use of frequently, should exercise no influence in determining a policy of placing the professional advantages of an active surgical clinic at the disposition of all who may care to avail themselves of it.

Each ship visiting a yard should promptly acquaint the dispensary with any case or condition developing on board which might in any way involve the health of the station, or with any matter of sanitary moment coming to its knowledge which properly concerns the medical officer of the yard, and it should also see to it that the garbage and refuse equipment placed on the deck for its use and its surroundings is kept in perfect sanitary condition. It should not be necessary for the medical officer of the yard to make complaint to secure such attention, and it is not necessary when the medical officer of the ship is properly alive to the comfort of his ship, as represented in the decency of its immediate vicinity.

It would be an excellent practice and a means of gathering up many otherwise loose ends if medical officers of ships visiting navy yards would, as soon as possible after arrival, get in personal touch with the medical officer of the yard, to advise him of conditions aboard ship and to acquire a broader and more detailed view of the station and its vicinity than it is possible to give in a written communication.

In the office of the medical officer of the yard, at the Boston and Philadelphia yards, are displayed large maps of the city and its suburbs, on which, by the aid of colored pins, the exact location of all communicable diseases is definitely shown; and, as this is kept posted daily by means of reports from the various boards of health, it furnishes an absolute guide to any one wishing to know the health situation. This map was originally planned for the benefit of visiting medical officers, but has been found of great value also for the tracing of diseases among the civil employees and others attached to the yard.

It is manifestly impossible, in view of the many other demands upon his time, for the medical officer of a yard to have such constant or frequent supervision of the innumerable matters and features of sanitary moment connected with a large station as is desirable to maintain the best conditions at all times. Under existing circumstances, the medical officer has no official assistance in these directions. A sanitary inspector could be employed to great advantage, but, in the absence of such a representative of the medical department who could give his whole time to field sanitary work of varied character, the services of the master of the yard, or foreman of yard laborers, if he has any genius in this direction, may, with the permission of the public works officer, be informally enlisted. He is constantly going about the navy yard; he has all the laborers on maintenance under him; and he is responsible for the general conditions of the government premises, including sewers and toilets. The identity of what is at least superficially sanitary, with what is pleasing to the eye, is patent even to the uninitiated, but the less obvious sanitary requirements can be shown to be important to the completeness of his task, and with tact he can be interested and instructed along these lines. One of the most useful books for this purpose is the elementary "Primer of Sanitation," by Ritchie. This alliance with the master of the yard is not, of course, necessary in order to secure the correction of defects, but it will foster an enthusiasm, insure a more hearty co-operation, bring quicker results, and obviate the necessity of continually bothering an already busy commandant with matters which though important, sanitarily speaking, are trifling in an official sense. What most commandants are looking for is results, and, if these can be given him without too much fuss and display, when his authority can reason-

ably and properly be assumed or is understood, so much the better. Needless to say, the commandant must be kept advised; but this can be accomplished by personal interviews at appropriate times, or through the medium of the monthly report.

It has been the practice at Philadelphia, as it was at Norfolk, never to make any but the broadest and most general recommendations in these reports, and, outside of embodying in them up-to-date information concerning matters of standard health interest, they have consisted of a review in brief of observations and progress made, and of the subjects of specific recommendation submitted by memoranda from time to time during the month, as the need developed. Such memoranda may be of two classes: (a) concerning defects or improvements which will be of little or no expense to correct or make; and (b) concerning necessary or desirable improvements for which sufficient money is not at the time available and for which allotment or appropriation should be asked. They save the medical officer's ideas, on any subject, from being lost sight of in the mass of other material, and constitute the means for a convenient, sharply defined presentation of each separate matter, which the commandant can consider on its merits and refer to this or that division head for action. It seems always well to lay the more important of these before the commandant in person, so that they may not be lightly passed over in the general pile of correspondence, to explain any point that may be obscure, and to give them that personal touch which often helps to secure fair way. Moreover, it has been our policy to never make recommendations on any subject until existing practices have been studied, and all the conditions bearing upon it, including the disposition of those who are going to be affected by the proposed change, have been given due weight, and then to approach the ideal only so far as it comports with the practical, from the point of view both of available money at the disposition of the public works officer and of material obstacles.

Finally, the medical officer should see to it that his division is a thoroughly co-operative and dependable unit of the command. There should be no inertia requiring the prompting of the commandant. He should be convinced by action that assigned duties will be performed efficiently and expeditiously, that he may look with confidence for results, and, once an order is given, he may dismiss the matter from his mind in the interest of other con-

stantly appearing pressing problems, in the knowledge that the matters so entrusted to his medical officer will in due time be brought to his attention in completed form for final action, if need be. The administrative head of a large establishment like a navy yard, is too busy to have to bear in mind or keep before him the hundred and one matters under his jurisdiction connected with its operation. He has a right to expect his subordinates to exhibit a sense of responsibility, and to relieve him of such a necessity, once he has given an order or expressed his desire and explained his purpose in either.

While effort has been made to advantageously employ the latitude of our area of discretion in the manner we have attempted to outline, it must be remembered that there is room for improvement, and perhaps modification. The foregoing is merely a review of what two individuals have done, embodying suggestions which will have to be adapted to conditions at other localities. The underlying principles alone are fixed.

In conclusion, it may be said that one's bearing in relation to others, and the attitude one assumes toward a given task, will go far to determine success or failure. A determination to do the best one can, will open up unexpected vistas of interest, and inject an enthusiasm into a seemingly dull and prosaic field of duty.

The very fact that one is exercising his own ingenuity, searching for new avenues of usefulness and giving some service from his powers to originate, beyond the strict letter of the regulations, gives birth to a subtly gratifying sense of contribution to that part of the public weal in which one's lot is cast; to a feeling of partnership—even proprietorship—in the increasing efficiency of the service.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

CAPTAIN NICHOLAS BIDDLE

(Continental Navy)

1750-1778

By EDWARD BIDDLE

The subject of this sketch was born in Philadelphia on the 10th day of September, 1750. His father was William Biddle, of New Jersey, son of one of the first settlers and proprietors of that state, who had removed to Philadelphia previous to Nicholas' birth. His mother was the daughter of Nicholas Scull, who was for many years surveyor general of Pennsylvania.

He was brought up to the sea, and when less than 16 years of age gave striking proof of that courage and fortitude for which in after-life he became distinguished.

In a storm in January, 1766, off the coast of Yucatan, the vessel in which he and his brother Charles were serving was wrecked. Charles, then five years older than Nicholas, wrote afterwards in his autobiography:

> We were going at the rate of seven or eight knots when she (the vessel) struck. The first stroke she gave was dreadful, and if she had been loaded with any other cargo than mahogany and logwood she would have gone to pieces in an hour. The second sea that struck her carried her within the outer-breaker, and fortunately threw her broadside to the sea, by which means our boats could live to leeward of her. We hoisted them out; the long-boat was soon lost. The yawl we veered away with a hawser. *My brother Nicholas went in her, and did everything he was ordered with as much coolness as he would have done alongside the wharf.*

Nicholas underwent a very trying ordeal after the foundering of the ship. The yawl being too small to contain the crew of ten, lots were drawn as to who should go back to St. George's Key in her and who should await rescue on the Triangles. It fell to Nicholas' lot, with three others of the crew, to remain on the island. Here they tarried two weeks[1] with only slight means of

[1] Some accounts state *months*. E. B.

sustaining life. Had it not been for his brother Charles Biddle's incessant efforts in organizing a rescuing party, Nicholas might never have left the island alive. Several times the boat in which the rescuing party succeeded in setting sail was turned back by contrary winds, but still Charles persevered: let him tell the end of the rescue in his own words:

> When we came within a quarter of a mile of the landing I stood up and called to my brother and Armstrong (one of the crew). Nothing could exceed their joy . . . . it was near two weeks we had been absent. I was shocked to see how miserably they looked. The water on the island was so bad that nothing but necessity could induce them to drink it.

After other voyages less disastrous, our youthful sailor, still seeking activity and adventure determined to enter the British Navy. Going to London with letters of recommendation, he was rated as a midshipman on board of a British sloop-of-war commanded by Captain (afterwards Admiral) Stirling. At the time of his enlistment there had been a prospect of active service against Spain, but in this he was disappointed. An extract from a letter written his brother Charles in America, from on board the man-of-war *Portland* at Montserrat, British West Indies, under date of June 20, 1772, shows very clearly his state of mind:

> I have little, too little, duty. I have plenty of time to study or learn what I choose. This situation I liked very well *with the expectation of a War*. . . . .

At Antigua, in the month following, under date of July 6, he writes to his brother James:

> I shall make a purchase of a sextant if I can meet with one that is cheap, as I know every method yet proposed for finding the Longitude. I will also get a three-foot telescope if I continue in the Navy, in which I intend to be guided by Captn. Stirling's advice. I am extremely fond of him, he has not only the character of an excellent commander but that much nobler of an excellent man.

This commission in the *Portland* came to an end in the autumn, for a letter to his sister Lydia from London, dated October 20, 1772, recites:

> DEAR SISTER:
>
> The *Portland* is paid off and Captn. Stirling being in a bad state of health don't choose to be employed. But the case is otherwise with your Most Obedient; I am ready for any service or station.

After playful allusion to the British being so much engaged just then with the suppression of an Indian revolt at St. Vincent's as to prevent their engaging in war, he continues:

I foresee your curiosity will not be satisfied with what I have already said, therefore shall endeavor to do so far as my abilities will let me.

I wear my own hair, black hat, cloth coat, knit breeches, paper colored stockings (white?), leather shoes, metal buckles and linen shirt. I lodge in London and sleep in a bed.

In the next succeeding months an opportunity for more active employment presented itself, when a voyage of discovery was planned to ascertain how far navigation was practicable towards the North Pole. Extremely anxious to join this expedition, young Biddle at once endeavored to gain permission to do so. Not being successful in his application to the authorities, he determined to enter before the mast, and did so. On this same expedition went young Horatio, afterwards Lord Nelson. Both he and young Nicholas are said to have been appointed coxswains, a station always assigned to the most active and trusty seamen. The expedition penetrated as far as the latitude of 81 degrees and 39 minutes, and experienced all the hardships and vicissitudes of an Arctic voyage.

We get a glimpse of young Nicholas' hardy and unaffected character in a letter written to his sister from London on the return of the expedition. This letter is dated almost a year to a day, after the one we have just quoted from:

LONDON, Oct. 18th, 1773.

MY DEAR SISTER:— . . . . 'Tis three days since we were discharged from the *Carcass* (name of vessel). I suppose I should now give some small account of our proceedings, or do you not think it would be most proper first to forewarn you not to credit idle tales; for you must know I have been so frightened, so terrified at hearing of the surprising difficulties we encountered, the dreadful dangers we were in, that I am positive my hand shakes while I write, and what astonishes, confounds and frightens me most of all is that during the whole voyage, I did not apprehend danger (!). But now good lack-a-daisy perceive it plain as the Ballad in sister Polly's hand!

On the vessel's return to England, ominous signs were beginning to appear in the inter-relations of England and her American colony. Young Biddle soon resigned his commission and returned to Philadelphia, eager to enlist in the service of his country.

His first commission was in command of the galley *Franklin*, fitted out for the defence of the Delaware. This was under

authority of the *Committee of Safety*, of which Benjamin Franklin was president, and bears date August 1, 1775. It recites:

We, reposing especial trust and confidence in your Patriotism, Valour, Conduct and Fidelity, do by these Presents constitute and appoint you to be Captain of the Provincial Armed Boat called the *Franklin* fitted out for the protection of the Province of Pennsylvania and the Commerce of the River Delaware, against all hostile Enterprizes and for the defence of American Liberty.

In December of the same year he was given command of the brig *Andrea Doria* (14 guns and 130 men), coming now directly into the service of Congress, as the following document plainly shows:

To Nicholas Biddle, Esquire, Captain of the Brigantine Andrea Doria.

You having received a Commission from the Congress to command the aforesaid Brigantine you are hereby directed to take charge of her and all her officers, men and stores, to see that everything be conducted in the most prudent manner and that the most careful and exact discipline, peace and good order be maintained on board the said Brig, and that you put yourself and the Brig aforesaid under the direction of Esek Hopkins, Esquire, Commander-in-chief of the Fleet of the United Colonies, and to follow, observe and obey all such directions, instructions and commands as you may receive from him; and carefully observe and answer all such signals as he may display, for which purpose you will secure from him an account of the intention and signification of each signal. And you are to be particularly careful that you do not separate from the Fleet unless by express orders from the Commander-in-Chief, but if by the extremity of weather it should so happen, you are to use your utmost endeavours to join it again immediately at such rendezvous as may be appointed for that purpose.

Dated at Philadelphia Jany. 6th, 1776.
By order of Congress.

(Signed) STEP. HOPKINS
CHRIST. GADSDEN
SILAS DEANE
JOSEPH HEWES

His vessel sailed with the fleet under Commodore Hopkins in the expedition against New Providence.

While waiting in the Delaware to set sail on this expedition, an incident occurred that revealed our young commander's mettle.

Two deserters from the *Andrea Doria* were reported at Lewes in prison. He sent an officer on shore to bring them back to the ship. The officer returned without his men, reporting that they, with other prisoners, had armed themselves and barricaded the door of their prison, swearing they would not be taken alive. The

militia of the town had been called out, but hesitated to proceed to extremities. Taking a midshipman with him, Captain Biddle went directly to the prison and ordered one of the deserters inside, named Green, to open the door. His demand was met with a surly threat that if the captain attempted to enter he would shoot him. Captain Biddle ordered the door to be forced, and with a pistol in each hand stepped inside. Looking steadily at the threatening ringleader, who was armed with a musket and stood prepared to fire, he said, "Now, Green, if you do not take good aim you are a dead man!" His look and maner had such an effect that no further resistance was attempted, and the prisoners were soon secured.

It was at this time, before leaving the Capes, that he wrote his brother James:

> I know not what may be our fate; be it however what it may, I will never cause a blush on the cheeks of my friends or countrymen.

A letter extant gives an account of the *Glasgow* incident during the New Providence expedition, when the English vessel managed to escape the efforts of the fleet. He played his own part in the action manfully, engaging and pursuing the enemy until the Admiral's signal was run up ordering the chase to be abandoned. This is not the place for a discussion of the wisdom or unwisdom of the maneuvers of the entire fleet. At some future time the writer may develop the subject from the correspondence adverted to.

Captain Biddle's after-cruise, independently in the *Doria*, resulted in a constant succession of captured prizes. Receiving orders to proceed off the Banks of Newfoundland in order to intercept the transports and storeships bound to Boston, he captured before reaching the Banks, two ships from Scotland with 400 Highland troops destined for Boston. When he arrived in the Delaware he had but five of the crew with which he sailed from New London, the rest having been distributed among the captured vessels and their places supplied by men who had entered from the prizes taken. He had a great number of prisoners, so that for some days before he got in, he never left the deck.

That his sterner virtues did not obliterate or subdue the gentler qualities of his spirit is shown by the care bestowed upon the sick coming under his charge during and following the expedition to New Providence. Smallpox broke out among the seamen of the

fleet and the *Doria* was for a while converted into a hospital ship. Here Captain Biddle gave unremitting attention to the sufferers, resigning his own quarters to a young midshipman sorely stricken by the disease, and watching over him.

His brother's eulogium on him as "one of the best and bravest of men" springs to mind; and his personality as described by the former conjures up one who might well have been a sympathetic and welcome visitor in the sick-ward. Charles Biddle notes "He was a remarkably handsome young man, and very cheerful and entertaining," adding, "I believe he never drank a quart of liquor in his life." That he was possessed of great physical strength the lineaments of his countenance denote. The brush of Peale, the great American painter in the Revolutionary period, has well expressed on canvas the predominant traits of vigor joined to a calm resolution he exhibited so often at critical moments.

Before the first year of the war was ended, Nicholas Biddle was regarded at Philadelphia as one of the most active and efficient men in the naval service of the infant government. That even in so short a time he had won the confidence of those charged with the administration of the navy, the command to which he next succeeded furnishes abundant proof.

The frigate *Randolph*, of 32 guns, which had been building, was completed in November, 1776, and our young Captain was made commander.

In fitting her out for sea, it was found difficult to procure a suitable crew. Privateering in small vessels had attracted many capable seamen, depleting the available supply. To make up a sufficient number, Captain Biddle accepted some volunteers from the prisoners taken with his prizes; these proved to be troublesome members of the crew. Then to fill up, Congress drafted a partial crew from the army. With this heterogeneous body to man the vessel and after being delayed in obtaining a store of ammunition, the *Randolph* set sail from Philadelphia in February, 1777.

On the eve of the *Randolph's* departure, and under date of January 30, 1777, Robert Morris—then vice-president of the Marine Committee—addressed a letter to her captain. In it he expresses a conviction that the *Randolph* will prove a speedy vessel, and curiously enough gives warning as to the danger of engaging "two-deckers." On the 15th of February, he writes again, countermanding the first orders given and appointing Captain Biddle

to sail for the Island of Martinique, there to take in stores and ammunition. At this juncture, however, the familiar saying about the "unexpected" was fulfilled, for shortly after leaving the Capes of the Delaware in a violent gale encountered, the *Randolph's* masts gave way, and had it not been for her commander's exertions she might never have reached port. Writing under date of February 11 from Charleston, S. C., where he succeeded in bringing his vessel in safety, he expresses himself as follows:

CHARLESTOWN (Charleston), Feby 11th, 1777.

MY DEAR BROTHER:—

I have just got here after one of the most disagreeable passages that ever I experienced. We sprung our foremast and were forced to get everything off it to keep it from going over the side. And a few days after we lost our mainmast which gave way even with the deck and gave little more warning than was necessary to stand from under. As it blew a fret of wind and a very high sea going to see it stagger from side to side with the roll of the vessel was as unpleasant a sight as ever I wish to behold. We rigged jury masts and very fortunately had got in just before a gale of wind came on that would undoubtedly have put us ashore. The *Randolph* is the very best vessel for sailing that ever I knew. I hope soon to be out in her again.

A person of credit declares to me that he knew those spars our masts were made of to have lain these 18 years in the water at the mast yard. . . . .

I lost 14 or 15 men on the passage by sickness but have been very hearty myself. . . . .

My love to Fanny and the family. God bless you.

N. B.

From some cause unknown, his letter to the Marine Committee must have miscarried, for under date of April 26, 1777, the Committee write to Captain Nicholas Biddle:

Your letter of the 14th instant is the only one we have received since the misfortune of carrying away your masts or indeed since you left the Capes of Delaware so that we are strangers to the cause and manner of that unfortunate incident, if you wrote any previous letter it never reached our hands.

Our young commander was not long in getting his vessel refitted, and was soon on a cruise to the West Indies. On this cruise he captured the English ship *True Briton*, 20 guns, having under convoy three merchantmen, and carried the four prizes into Charleston Harbor. This exploit gave great satisfaction in the South, the vessels being laden with arms and ammunition, of both of which that part of the country was then much in need.

Following this, for some months the *Randolph* was blockaded by a superior force in Charleston Harbor. But by February, 1778, a force had been gotten together with which it was hoped a successful attack might be made upon the blockading fleet. For this purpose the *Randolph*, accompanied by the *General Moultrie*, 18 guns; the *Polly*, 16 guns; the *Notre-Dame*, 16 guns, and the *Fair-American*, 14 guns, sailed together. They were on the lookout for the *Carrysfort*, 32 guns; the *Perseus*, 24 guns; the *Hinchinbrook*, 16 guns, and a privateer.

The squadron was delayed in getting to sea by contrary winds, and low water on the bar, the *Randolph* being a vessel of unusual draft. During the delay the British cruisers disappeared, so that when the American ships did get to sea they set their course to the eastward, hoping to fall in with the enemy. In this they were not successful; but about 3 p. m., on the 7th of March, a signal was made from the *Randolph* for a sail to the windward, in consequence of which the squadron hauled on the wind and stood for her. As the sequence will prove, this strange sail turned out to be the English "two-decker" *Yarmouth*, carrying 64 guns. Two or three accounts of the action that ensued between her and the *Randolph* have come down; one by Captain Blake, commanding the marines on the *Moultrie*, another through one of the latter's crew, besides the report of the captain of the *Yarmouth* to his home government.

Captain Blake relates that, two or three days before this meeting, he had dined on board the *Randolph*, when Captain Biddle expressed himself to this effect:

> We have been cruising here for some time and have spoken a number of vessels who will no doubt give information, and I should not be surprised if my old ship should be sent after us, but as to anything that mounts her guns on one deck, I think myself a match for her.

The "old ship" here alluded to was the *Portland*, a 50-gun ship, on which Captain Biddle had formerly served in the British Navy. Let us follow Captain Blake in his recollections of what ensued after the first sighting of the *Yarmouth*.

> It was near 4 o'clock before she could be seen from our quarter deck. . . . . About 6 o'clock I again looked at her through the glass. At this time she had neared us so much that her topsails were out of water . . . . and coming down before the wind she had the appearance of a large sloop with only a square sail set. About 7 o'clock the *Randolph* being to windward hove to; the *Moultrie* being then about 150 yards astern

and rather to leeward also hove to. . . . . About 8 o'clock the British ship fired a shot just ahead of us, and hailed asking what ship it was. The answer was the *Polly*, "Where are you from?" Answer, "from New York." She took no further notice of us, but immediately hauled her wind and hailed the *Randolph*. At this time, and not before we discovered her to be a "two-decker." One or two questions being asked and answers returned as she was ranging up alongside of the *Randolph* and had got on her weather quarter I heard Lieut. Barnes very distinctly call out "This is the *Randolph*," who immediately begun the action. The British ship's stern being then clear of the *Randolph* the Captain of the *Moultrie* gave orders to fire and in consequence of it three broadsides were fired, the last of which I am satisfied must have gone into the *Randolph*, as the enemy had shot so much ahead as to bring her between us. I then mentioned with some warmth to our Captain that instead of assisting we were firing into the *Randolph*, in consequence of which we immediately made sail to get ahead and engage her on the bow, but before this could be effected the *Randolph* blew up.

John Davis, a member of the *Moultrie's* crew, in his formal statement relates as follows:

That in February 1778 I sailed in the ship *Gen'l. Moultrie* from Charleston in company with the *Randolph*, Capt. Biddle. That on the 7th of March following at 1 P. M. we discovered a sail standing for us when the *Randolph* made a signal to heave to. About 4 P. M. Capt. Biddle hove out a signal to make sail. We then spoke him and Capt. Biddle told us that one of his crew had deserted from the British ship *Yarmouth*, of 74 guns, and he knew the ship to windward to be her—and from her appearance he had no doubt it was her; notwithstanding which, Sullivan (Captn. of *Moultrie*) did not make sail, and the *Randolph* was obliged to engage the *Yarmouth* or sacrifice our ship. The *Yarmouth* hailed us as she passed. We answered the "*Polly* from Charleston" and that our convoy was ahead. They then hailed the *Randolph;* and immediately after engaged. The *Randolph* appeared to fire four or five broadsides to the *Yarmouth's* one until she blew up, when Sullivan hauled down his colors, and we should have been taken but for Capt. Blake, who commanded the marines. He insisted upon our making sail and such was the confusion on board the *Yarmouth* as she was so much injured during the engagement that they took no note of us.

Capt. Nicholas Vincent, of his Britannic Majesty's Ship *Yarmouth*, 64 guns, reported under date of March 17, 1778, that on the 7th of March he fell in with 6 sail eastward of the Barbadoes, standing on the wind. . . . . About 9 o'clock in the evening he succeeded in ranging up on the weather-quarter of the largest vessel of the strangers. Hoisting her own colors, the *Yarmouth* ordered the ship near to her to show her ensign, when the American flag was run up and the enemy poured in a broadside.

A smart action now commenced and was maintained with vigor for 20 minutes, when the stranger blew up. The two ships were so near each other at the time that many fragments of the wreck struck the *Yarmouth*,

and among other things an American ensign rolled up was blown in upon her forecastle. This flag was not even singed. (The vessels in company sailed in different ways and the *Yarmouth* gave chase to two, but her sails had so suffered in the engagement that the chased vessels were soon out of sight.) The *Yarmouth* had lost 5 men killed and twelve (12) wounded. On the 12th, while cruising near the same place, a piece of wreck was discovered on which were five men making signals for relief. When these were taken on board the *Yarmouth* they reported themselves as having belonged to the U. S. Ship *Randolph*, 32 guns, Captn. Biddle, the vessel that had blown up on the night of the 7th in action with the English ship. They had floated on the raft five days without sustenance save a little rain water. They stated that early in the engagement Commodore Biddle was wounded, but ordering a chair was placed in it on the quarter-deck, and continued to direct the battle and encourage the crew. His fire was constant and well directed. . . . . Just then while a surgeon was examining his wound, the *Randolph* was blown up and the commander, with 311 of her 315 officers and men, perished.

Charles Biddle, after reviewing the testimony of those I have quoted, notes in his autobiography:

As soon as my brother was certain that she was a ship of the line, he hove out a signal to make sail, which was instantly obeyed by all the fleet but the *Genl. Moultrie*, who lay with her maintop-sail to the mast, so that Captn. Biddle was obliged to engage the *Yarmouth* or sacrifice the *Genl. Moultrie*. It is probable he expected to cripple the *Yarmouth*, which he in some measure did, and very likely would have effectually done it but for the unfortunate accident that happened. One of the men picked up by the *Yarmouth* sailed with me from Baltimore. He told me he was stationed at one of the quarterdeck guns near Captn. Biddle who early in the action was wounded in the thigh. He fell, but immediately sitting up again, and encouraging his crew, told them it was only a slight touch he had received. He ordered a chair and one of the surgeon's mates was dressing him at the time of the explosion. None of the men saved could tell by what means the accident happened. Mr. Davis told me that the *Randolph* fired 4 broadsides to the *Yarmouth's* one, and that she was in a perfect blaze from the time the firing first began until the explosion. Capt. Morgan told me he thought it was the ship the *Randolph* was engaged with that had blown up, and he bore away to inquire how Capt. Biddle was, and had the trumpet in his hand, going to hail, before he found his mistake.

The writer has found the idea advanced in one of our naval histories "that it is entirely probable that Capt. Biddle would have attempted to decide the conflict by boarding the enemy's vessel." Circumstances appear to support this view. He had a most excellent crew when sailing from Charleston, for his brother, after the tragedy, writes:

Thus fell, in the 28th year of his age, one of the best and bravest of men, *and as gallant and well-disciplined a crew as ever sailed the ocean.*

The great discrepancy in weight of metal and strength of hull, as between the *Randolph* and the *Yarmouth,* in a long encounter would be bound to tell, and with a knowledge of the fact, the *Randolph's* commander evidently planned to push the attack home as soon as possible, delivering broadside after broadside at close range and closing in on the enemy. The after-evidence discloses how close the vessels were before the fatal explosion. His wound might have interfered with the plan, although as captain of the vessel he would probably have confided the command of the boarding-party to his officers and remained in command of the ship.

In Cooper's Naval History, the following notice of Captain Biddle occurs:

There is little question that Nicholas Biddle would have risen to high rank and great consideration, had his life been spared. Ardent, ambitious, fearless, intelligent, and persevering, he had all the qualities of a great naval captain, and, though possessing some local family influence perhaps, he rose to the station he filled at so early an age by personal merit. For so short a career, scarcely any other had been so brilliant; for though no victories over regular cruisers accompanied his exertions, he had ever been successful until the fatal moment when he so gloriously fell. His loss was greatly regretted in the midst of the excitement and vicissitudes of a Revolution, and can scarcely be appreciated by those who do not understand the influence that such a character can produce in a small and infant service.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

STRENGTH IN ACTION

By Lieutenant W. F. Jacobs, U. S. Navy

The United States should maintain the policies in which its people believe with a navy based on large battleships. These policies are not always clearly held before the public view; but those for which the country may sometime have to fight may be briefly stated as follows:

1. No entangling alliances.
2. America for the Americans.
3. An open market for all in the East.
4. The freedom of the seas for neutrals.
5. The superiority of the white race in America.

If the majority of the men and women of the United States believe in any one of these policies, or in all of them, it is the duty of the leaders, of the statesmen, to carry out that one or that all. This can be done by far-sighted political leadership, backed by force. Obviously, in our geographical position, the keenest, heaviest, weapon of force will be a strong and well-balanced navy. Such a navy will be one with a single objective in all its various departments—ability to successfully exert power at the necessary point. That is the real purpose of a navy.

The navy of the United States is for the citizens and is controlled by them through their representatives in the Congress and through the chief executive—the commander-in-chief. The commander-in-chief administers the navy directly through the officers, civil and military, appointed by him with the consent of the Senate. In turn these officers conduct the Navy Department with its various bureaus; the naval stations, building and repair plants; the educational institutions, and the battle fleet. In order that the fleet shall be a well-balanced, coordinated, fighting unit, all other departments and branches of the navy must be adjusted to that end—harmonized so that the wishes of the people will be expressed through the President to a fleet able instantly to exert the required pressure.

If we suppose, then, that all branches of the navy have been harmonized to the single objective of a combative fleet, the questions which we must propound are: Of what shall the body of this fleet consist? What class of vessels will best make the trunk of an organization, the purpose of which is to exert power at a particular point?

It is contended here that the most effective units for the intended purpose are large ships-of-the-line or battleships. By large battleships is meant those of the greatest practicable offensive and defensive power in guns, armor, cruising radius and speed; vessels of the type of the *Oklahoma* and the *Pennsylvania*. If the navy is supplied by the people with a certain amount of money to be expended on the body of a battle fleet it is claimed that the money can be put to better use in building the above-named type of vessels than in any other way.

The purpose of the navy is to exert pressure by the use or the "being" of the fleet; the mission of the fleet in war is to meet and destroy the main sea forces of the enemy. I shall endeavor to prove that not only the most effective, but the only effective instrument to this end is a force of large battleships with their proper auxiliaries.

For the large battleship embodies a concentration of power; a unified energy; an intensified strength in action.

I might argue that the large battleship is in the beginning, and is much more so in the end, a less expense in money to the state. I might contend that such a vessel is more economical in trained officers and men. These points may be proved, but it seems to me that they are comparatively of little importance. When that time comes when the armed force of the United States meets the enemy's fleet on the high seas, the great mass of people of this land in danger of invasion and conquest will not think of the cost in money or in men. They will think and say: "Can we beat them?"

Beat them, destroy them, crush them. It all amounts to the same thing and that thing can be accomplished and can only be accomplished by a superior concentration of power.

The Century Dictionary defines concentration as: "The art of collecting or combining into or about a central point; the art of directing or applying to one object; the state of being brought from several or all directions to a common point or center, or into one mass or group." The principle of concentration is the basis

of all successful strategy and tactics. The former may be termed the art of so directing military forces that they may advantageously make contact with the enemy, while the latter may be termed the science of maneuvering in the presence of a hostile body so that an overpowering energy can be brought to bear at some point of contact. All great leaders on land and sea have recognized these aims and have known that they depended upon concentration of some kind—concentration of strength in action.

In the battle of the Straits of Salamis, the first great decisive naval combat of which we have any account, the tactics were simple but effectual. The Greeks under the command of Themistocles and Eurybiades mustered 366 fighting galleys. The Persian armada had been reduced to some 600 vessels. The Greek commander sent a detachment to guard his rear, and with the remaining 300 galleys, the largest and best commanded, with the pick of the Athenian, Spartan, and island soldiers and sailors, he formed a close succession of lines between Salamis and the mainland. In this way his flanks were absolutely protected and he was enabled to oppose Xerxes' fleet with a force equal to it at the line of contact and with this force to break up and defeat the Persians. It was like one able man defending with his fists a narrow passageway against a number of lesser men. Leonidas at Thermopylae had done the same thing; but neglected to protect his rear. It was the principle of concentration of strength in action.

Some 2000 years later in the history of naval warfare the Turks opposed the Christians in the battle of Lepanto, the last great engagement fought with oar-driven galleys. The fleets were approximately equal in numbers of galleys and galliots; but the Christians had developed a large type of vessel called a galleass, the dreadnought of that day. The galleass was a heavy, three-masted craft with blunt bows and a great amount of tumble-home. Numbers of guns were mounted on the high forecastle and poop and in broadside. Below the gun-deck was the rower's deck where from 100 to 200 men pulled at the massive oars. Don Juan of Austria, the Christian commander, had worked out his plans with great care and attention to detail. He appears to have had something of the Nelson genius and the "Nelson touch." At any rate, he brought the enemy to action and used his galleasses in such a way that they were the deciding factors in that action. His plan was to form the

fleet in line abreast with two of the galleasses in front of the center and two in front of each of the flanks. The right flank under Doria, with his two galleasses, did not get into line in time to resist the Turkish advance, but, as the Moslem fleet in line swept down on Don Juan, the four galleasses in the Christian van demonstrated the worth of the big-gun-big-ship. The Ottoman line swayed and hesitated and was broken. Exposed to a storm of concentrated fire the galleys surged past in disarray and in that confusion were fallen upon by Don Juan's line. The battle, lasting about four hours, was hard fought; but Ali Pasha's disastrous and overwhelming defeat may be ascribed to the initial advantage, to the first heavy blow struck by the forerunners of the line-of-battle ship.

In a discussion of the value of the ship-of-the-line when compared to fast cruisers and commerce destroyers, Mahan says in his "Influence of Sea Power Upon History":

> It was not the policy of 1667 (commerce destroying), but Cromwell's powerful fleet of ships-of-the-line in 1652, that shut the Dutch merchantmen in their ports and caused grass to grow in the streets of Amsterdam. When, instructed by the suffering of that time, the Dutch kept large fleets afloat through two exhausting wars, though their commerce suffered greatly, they bore up the burden of the strife against England and France united.

And later on in the same chapter after a most comprehensive survey of the relative values of fleets of ships-of-the-line and of commerce destroyers in the various English, Dutch, and French wars, the War of the American Revolution, the War of 1812, and the Civil War, Mahan sums up as follows:

> It is not the taking of individual ships or convoys, be they few or many, that strikes down the money power of a nation; it is the possession of that overbearing power on the sea which drives the enemy's flag from it, or allows it to appear only as a fugitive; and which, by controlling the great common, closes the highways by which commerce moves to and from the enemy's shores. This overbearing power can only be exercised by great navies, and by them (on the broad sea) less efficiently now than in the days when the neutral flag had not its present immunity. It is not unlikely that, in the event of a war between maritime nations, an attempt may be made by the one having a great sea power and wishing to break down its enemy's commerce, to interpret the phrase "effective blockade" in the manner that best suits its interest at the time; to assert that the speed and disposal of its ships make the blockade effective at much greater distances and with fewer ships than formerly. The determination of such a question will depend, not upon the weaker belligerent, but upon neutral powers; it will raise the issue between belligerent and neutral rights; and if the bel-

ligerent have a vastly overpowering navy, he may carry his point, just as England, when possessing the mastery of the seas, long refused to admit the doctrine of the neutral flag covering the goods.

That Mahan was as great a prophet as he was an historian has been proved again and again.

It is probable that Napoleon was the greatest military strategist and tactician of modern times. He had a "topographical" mind. His genius was due to those qualities of acquiring accurate, detailed information; card indexing that knowledge in the proper files of the map of Europe carried in his head, and then acting quickly and decidedly to concentrate on his enemy's line of communications and strike that enemy or some part of him with a superior force. As long as he held to these principles he was successful. When, after 1810, he began to overrate himself, when he attempted the Peninsular War and the Russian War, when he abandoned the principle of concentration, he failed.

During the latter part of the seventeenth and the greater part of the eighteenth century it was customary for naval actions to be fought between fleets sailing close-hauled in parallel columns either in the same or in opposite directions. In this way ships were able to engage their whole broadsides with their opposites; but unless one belligerent was in overwhelming force the combats were frequently indecisive. It remained for Rodney to break the line at Saint's passage and by concentrating a local superiority of force win a decisive victory. Nelson, however, was the greatest exponent of these tactics and Trafalgar is the best example of their use. Briefly the action was as follows:

The allied French and Spanish fleet of 33 line-of-battle ships was in an irregular column on the port tack heading generally about north-northeast. The British fleet had the weather gauge, the wind being light from the northwest, and was in two squadrons; the northerly one of 12 ships led by Nelson in the *Victory;* the southerly one led by Collingwood in the *Royal Sovereign.* On signal from the flagship these two squadrons bore up and approached the allied fleet at an acute angle. Collingwood's squadron was headed so as to engage the *Santa Ana* and the 15 rear ships of the allied column. Nelson's squadron was apparently about to engage the van. At 11.30, as the *Royal Sovereign* came under fire, the *Victory* changed her course to the eastward and at 12 o'clock led the windward division into the allied center. Thus, for

some time, the entire British fleet in overwhelming force was in action with 22 of the French and Spanish ships. The morale of the allied van was probably somewhat shaken. Admiral Dumanoir, taken by surprise, held his course in spite of Villeneuve's repeated signals to engage. In any event, it would have taken considerable time for him to fall upon the British. The breeze being very light he could not tack; if he had worn, his ships would have been well to leeward, unable to force the fighting. There can be no excuse offered for Dumanoir; his lack of initiative enabled Nelson to achieve a great local superiority of force, to attain a concentrated strength of action. The battle lasted until five in the afternoon; but, as at Lepanto, was decided in the first hour.

Tsushima, the battle which decided the outcome of the Russian-Japanese War, is another and modern example of the virtues of a concentrated attack. At 2 o'clock the Russian main fleet was standing on a northeasterly course at about 12 knots in two columns; the right, containing the first division led by the admiral in the *Suvaroff*, slightly in advance of the left, containing the second and third divisions led by the *Osslyabya*. The Japanese main body of 12 ships was due north of the Russian second division and had begun to form single column and turn to the east-northeast, attempting to cap the enemy. The range at the time the Japanese began their turn was about 8000 yards. Rojestvensky opened fire on the *Mikasa*, and for a few minutes the Japanese were in a precarious position. Their ships were exposed to a heavy but ineffectual enfilading fire; concentrated, but not on the target. The *Mikasa* commenced firing at 2.10 when the range was less than 7000 yards. As the Japanese column straightened out, the Russians formed an irregular single column to the eastward. It was at this time that the Japanese closed to about 5000 yards and delivered their hottest fire. The *Osslyabya* was in flames. The rapidity and accuracy of the Japanese fire were remarkable. Semenoff, then on the *Suvaroff*, says:

> I had not only never witnessed such a fire before, but I had never imagined anything like it. Shells seemed to be pouring upon us incessantly.

The fleet of Japan, with its greatly superior speed, was enabled to range ahead and center its fire on the Russian leaders. To quote Semenoff: "His 12 ships were in perfect order at close intervals, steaming parallel to us, but gradually forging ahead. No disorder

was noticeable . . . . But with us? I looked around. What havoc! Burning bridges, smouldering debris on the decks, piles of dead bodies." At this point, the Japanese official account, translated by Lieutenant W. T. Hoadley, U. S. M. C., says:

> The *Suvaroff*, the leading ship, and the *Imperator Alexander III*, the second ship, both caught fire. The other ships, one after another, met the same fate. . . . . Our main fleet, while continuing the attack, ran to the southeastward and took position ahead of the enemy.

The essential part of the battle was over. The rest was merely a completion of the destruction. The Japanese won largely through their ability to deliver a hot, concentrated fire from a superior tactical position.

Now, since fleets are meant to exert strength in action—to win battles; and, since history shows us that battles are won on land and sea by securing an advantageous tactical position and delivering an overwhelming, concentrated fire, is it not logical to compose our fleets of units which are the embodiment of concentrated power—of large battleships? Such a vessel of war is necessarily a compromise. It must combine many qualities, and cannot wholly sacrifice one for the purpose of obtaining others. It must have sufficient radius of action to allow it to take and keep the sea at a distance from its base for long periods of time. It must have a maximum speed which will permit it to force an action when the commander-in-chief so desires, superior speed being the modern equivalent of the weather gauge. It must be protected in its vitals; able to withstand cruel punishment, such pounding as the *Chen-yuen* and *Ting-yuen* received at the Yalu. It must, above all, be able to deliver from guns and torpedo tubes the greatest possible accurate and sustained fire effect.

For only by bringing the enemy to action, receiving and giving blows, can battles be won. The ship of this type may be compared to the finely trained heavy-weight pugilist, able to endure tremendous punishment while beating his adversary into a coma. With the ship, as with the boxer, a preponderance of offensive skill and strength will largely, not wholly, make up for a lack of defensive toughness. As Farragut expressed it:

> The best protection against the enemy's fire is the steady fire of your own guns.

Only a ship of great displacement is capable of combining these four essential characteristics—steaming radius, speed, ability to

withstand punishment, power to deliver heavy blows. Admiral Fiske says in the *North American Review* for November, 1915:

> There are two main reasons for building a small number of large ships rather than a large number of small ships. The first reason is that large ships are much more steady, reliable, safe and fast than small ships. The second reason is that, when designed for any given speed, the large ships have more space available for whatever is to be carried; one 15-knot ship of 20,000 tons normal displacement, for instance, has about one and one-half times as much space available for cargo, guns and whatnot, as four 15-knot ships of 5000 tons each. These two reasons apply to merchant ships as well as naval ships. A third reason applies to naval vessels only, and is that a few large ships can be handled much better together than a large number of small ships, and embody that "concentration of force" which it is the endeavor of strategy and tactics to secure. A fourth reason is the obvious one that large ships can carry larger guns than small ships.

The displacement or weight of a ship may be divided roughly into four parts to correspond to the tactical qualities required. First, there is that component which may be assigned to radius of action: this includes fuel and storage capacity, as well as living space. Then, some part is allotted to speed: boilers, engines and auxiliaries. Next, a certain weight is apportioned to defensive armament: this includes armor, cellular division of hull, and torpedo defence guns. Finally, some amount of the displacement is specified for purely offensive armament: for the torpedoes, powder and shells, and heavy guns. It is feasible, according to the best authorities, to allot about 20 per cent of the total displacement to that potential offensive power, the heavy guns with their ammunition. Thus, if we wish to mount twelve 14-inch guns, with a supply of 120 rounds for each, we should find that the total weight would be 5700 tons, requiring a displacement of at least 28,000 tons. The *Pennsylvania's* is 31,400. In one salvo, such a battery would throw at the target about eight tons of metal; while two vessels of the *Michigan* class, each half the size of the *Pennsylvania* and each mounting eight 12-inch guns, would only throw at the target a quantity of metal less than seven tons in weight. The total exploding charge carried to the target in the salvo from the two *Michigans* would be about 3 per cent of the weight of metal or 408 pounds, while in the case of the broadside from the *Pennsylvania* the exploding charge would be about 3½ per cent of the weight of metal or 560 pounds. Moreover, the respective penetrating powers, at mean ranges, of the 12-inch and 14-inch guns are in the approximate ratio of 12 to 15.

It would be possible to mount four 14-inch guns, but no more than four, on a vessel of 10,000 tons displacement or one-third that of the *Pennsylvania.* Then three such vessels would be equal in gun power to the large battleship. But, though practicable to mount four 14-inch guns on a vessel of 10,000 tons, it would not be possible to give such a vessel all the qualities of endurance, radius of action, and speed, of a *Pennsylvania.* Some characteristics must be sacrificed. In addition, a battleship of this type, simply because of its comparatively small size, would be neither as good a gun platform nor as good a sea boat as one of 30,000 tons. These are points of vast importance. Seaworthiness is not alone a matter of comfort; it is frequently a matter of ability to cast loose and fight in a heavy sea when a less worthy ship is burying her guns beneath every wave. There is all the difference betwen a poor gun platform and a good one that there is between an automobile ride over a country road and one over the Coney Island Speedway.

I have said that these three 10,000-ton battleships would be equal in gun power to a *Pennsylvania,* but that does not mean that they would be equal in hitting efficiency—in concentration of hits on one target. It is a well-recognized fact in fire control, that with more than two ships concentrating on one target, there is a certain loss of hitting power. In order to gain a maximum fire efficiency it is necessary that neither the rapidity nor the accuracy of fire of the individual ships be reduced. Experience has shown that ships concentrating on the same target, in order to avoid confusion should not fire simultaneously, but in succession. Now if we assume the time between successive salvos on each ship to be 40 seconds, there will certainly not be time for more than two ships to concentrate on one target without interference destructive to accuracy. If we assume a greater time between salvos, there will be an aggregate loss in rapidity of fire.

Let us imagine a fleet composed of 30 of these 10,000-ton battleships fighting an action against 10 *Pennsylvanias.* That a fleet of 30 small battleships would be difficult to handle is evident. We shall asume that the two commanders-in-chief are equal in ability. We shall not take into consideration that supreme factor—the morale of the personnel. Since the small battleships have no superior speed, they are not likely to gain an initial advantage of position. If in a simple line or column at a distance of 400 yards,

they will be spread over 11,600 yards of sea, while the larger battleships at 500 yards distance will be concentrated in a column only 4500 yards long. Is it not reasonable to suppose that the commander-in-chief of the *Pennsylvanias* would keep his fleet at extreme range, direct his fire at the 10 nearest small ships, remaining out of range of all or nearly all of the others, while overwhelming the first 10 with a fire three times their own weight? Upon crushing them, would he not drop back to the next 10, and so on?

This is the same principle, in a different form, of the concentrated strength in action shown by the Greeks at Salamis, by the Christians at Lepanto, by Nelson at Trafalgar, and by Togo at Tsushima. It is not meant to contend that the big ship has always won over the small one or that it always will. Frequently in the past the concentrated energy has been in the brain of the commander-in-chief and in his men rather than in the material of his fleet. Superior skill and discipline will win battles in the future as in the past; but, with these qualities considered equal, it seems clear that strength in action is best exemplified in the large battleship.

Those who are not in sympathy with the plea for the large battleship will say: "If one *Pennsylvania* is more valuable than two *Michigans* or three vessels of 10,000 tons, why not build a great ship of 60,000 tons, which, according to the above reasoning, would be worth more than two *Pennsylvanias?*" Well, why not build a 60,000-ton ship? The idea is not at all chimerical. Merchant vessels of that gross displacement were built several years ago. The only limits are the Panama Canal locks, the drydocks and the channels to our harbors. Is there anything more fantastic now about a 60,000-ton man-of-war, than there was 10 years ago about one of 30,000 tons? Such a vessel can be built—by some other nation. If the argument in favor of large battleships is good, if it is conceded that the body of the fleet should be composed of the most powerful type of fighting machine, why not risk something and construct a 60,000-ton ship now?

The dimensions might be somewhat as follows: Length, 725 feet; extreme beam, 102 feet; mean draft, 30 feet. A craft of these measurements, which I am merely assuming for one of 60,000 tons, would be able to dock in Newport News, Norfolk, Philadelphia, Boston or New York; only at high water, however, and after some changes have been made in existing or projected drydocks. Twelve thousand tons would be available for the main

battery; enough for sixteen 16-inch guns, mounted four in a turret. These guns would throw in one salvo shells weighing 32,000 pounds, with a total bursting charge of 4½ per cent or 1440 pounds, and a penetrating power at mean range of 18 inches of Krupp armor. Given a speed of 25 knots, and taking into consideration the concentration of power and simplicity of fire control, would not such a "large battleship" be more than equal to two *Pennsylvanias* or four *Delawares?* This may all sound like a dream; but a little dreaming mixed with a great deal of practical experience, such as our constructors have, ought to produce the ultimate type *now* rather than 10 years hence. It could not have been very long ago that someone dreamed the 42-centimeter howitzer—some American.

Thus far has been considered only one type of vessel, with which to make up the body of the fleet, in opposition to the large ship-of-the-line which has upheld the policies of great seafaring states since the days of Olaf Tryggveson. This type has the disadvantage of non-concentration, and a great advantage in that the loss of one ship is small loss to the fleet. The so-called battle cruiser has not been mentioned because it is, in reality, a large battleship with some offensive energy and considerable defensive armament sacrificed to speed. Battle cruisers are to-day necessary adjuncts to our fleet, simply because other great powers, with which we may come in contact, are equipped with them. There are, however, several other genera of vessels that might be proposed as foundations for the effective defence of America. Let us next consider the kind that largely surrenders defensive and offensive powers to speed and radius of action. Not the great battle cruiser, but the typical commerce destroyer, the corsair of the seas.

Fast commerce destroyers have been used in all ages. From the time of the long-oared Phoenician galleys, the piratical craft that roamed the Mediterranean and sometimes ventured into the broad Atlantic, to the vivid present, to this day of the *Emden* and *Moewe*, the commerce destroyer has been a recognized and capable instrument of war on the sea. But, capable as it has been in executing the purpose which its name implies, it has not in the past decided the results of great conflicts between armed states. Is it likely that the future will show a reversal of history?

England, in the reign of Charles II, after waging, with her fleets of ships-of-the-line, a successful war against the Dutch, placed these ships out of commission and determined through motives of economy to bring the conflict to an end by means of commerce-destroying frigates and privateers. The result was what might have been expected. De Ruyter, with a fleet of 60 line-of-battle ships sailed up the Thames, burned Chatham, destroyed merchantmen as far up as Gravesend, and remained in possession of the mouth of the river for several weeks. One month later the king agreed to peace.

Between 1701 and 1713, during the War of the Spanish Succession, it was the French nation that held to a policy of commerce destroying without adequate fleets. "Gibraltar temporarily in the possession of the English" to this day is one of the results.

In 1756, the Seven Years' War broke out. Again France relied on cruisers and privateers to capture and destroy the enemy's merchant shipping. Martin, in his "History of France," says: "From June, 1756, to June, 1760, French privateers captured from the English more than 2500 merchantmen. In 1761, though France had not, so to speak, a single ship-of-the-line at sea, and though the English had taken 240 of our privateers, their comrades still took 812 vessels. But the prodigious growth of the English shipping explains the number of these prizes." As Mahan so ably shows, these great losses of individual Englishmen caused suffering, but did not effect materially the growing strength and prosperity of the country as a whole. Great Britain and her allies, with their fleets, secured the most valuable colonies of France and Spain, including Canada and the great American hinterland. France was terribly humiliated by Lord Chatham in the Treaty of Paris, which in Article XIII provides that: "The Cunette (at Dunkirk) shall be destroyed immediately after the exchange of ratifications of the present treaty, as well as the forts and batteries that defend the entrance from the sea; and provision shall be made at the same time for insuring good air and health of the inhabitants, by such means as shall be approved by the King of Great Britain." The French ministry, by its parsimonious naval policy, allowed disgrace to fall upon a kingdom, and lost an empire in the west.

However, France learned its lesson and, in the war of the American Revolution, put great fleets of ships-of-the-line upon the sea—fleets under Suffren and de Grasse. The surrender of Cornwallis at Yorktown was one of the consequences.

The War of 1812 is of particular interest to Americans. Many successful frigate actions were fought. American cruisers and privateers captured or sank large numbers of the enemy's merchantmen and whalers in the Atlantic and Pacific. For the first two years the naval warfare on British trade was conducted with vigor and good fortune. But, when Napoleon fell and the British ships-of-the-line, which had been guarding the French "fleets in being" at Toulon and Brest, were released for duty abroad, our frigates were blockaded in port, an army was landed on the banks of the Chesapeake, and Washington was burned.

Again, in the Civil War, the damage done to Union shipping by the *Florida*, the *Sumpter*, the *Alabama* and other Confederate cruisers, was tremendous; but that damage did not affect the final result in the slightest. That result was accomplished by a process of attrition, made possible by an iron-bound naval blockade on the sea and rivers, supplemented by overwhelming concentrated attacks at the strategic points on land.

The admirable conclusion following a discussion of this subject written by the late Admiral Mahan has been quoted in the opening part of this essay. At the end of "The Influence of Sea Power Upon History" he sums up as follows:

> Commerce destroying by independent cruisers depends upon wide dissemination of force. Commerce destroying through control of a strategic center by a great fleet depends upon concentration of force. Regarded as a primary, not as a secondary operation, the former is condemned, the latter justified, by the experience of centuries.

There remain two types of craft that, it may be contended, can be used to protect the United States against invasion. The type which has apparently done such effective service in the present conflict—the submarine; and the much discussed semi-submersible ship-of-war.

The submarine, by no means a new implement of warfare, has developed remarkably within the past 10 years and will, undoubtedly, continue that rapid development. It is essentially an instrument with which a state, relatively weak in sea power, may harass or worry an opponent; but it does not have the characteristics necessary to make it a decisive factor in war, the distinguishing traits incorporated in the expression, "concentrated strength in action." The submarine has, or can be given, great radius of action, fair speed below the surface as well as on the

surface, the defensive property of submerging, and the offensive power of a considerable number of torpedoes. On the other hand, it lacks proper vision, the mobility is comparatively poor, systems of communication when submerged are not adequate, and it has proved recently to be extremely vulnerable to small, agile, screening and patrol vessels.

It is, of course, not asserted that submarines are of no military value. It is claimed that they cannot take the place of capital ships as a basis of naval defence, because they do not and, necessarily, cannot come up to the requirements of an instrument of war which has for its object "to meet and destroy the main sea forces of the enemy."

For, in order to meet the enemy, it is essential to have a speed and mobility about equal to his; and in order to destroy the enemy, it is necessary to concentrate and deliver an overwhelming attack. It is unreasonable to suppose that the submarine running submerged can ever attain a speed comparable to that of surface craft. This is merely a matter of physics and laws of resistance. When, however, the submarine is in a "light" condition it is extremely assailable. It may be attacked with comparative impunity by destroyers, air craft, and motor boats. If it submerges on the approach of these enemies, it is still visible to aeroplanes which may direct sweeping and netting operations. Probably, heavy gun-fire will never be used as a primary defense against submarine attack when these vessels are acting in conjunction with battleships which are in contact with the enemy. But, when large battleships with their auxiliaries are fighting against sea-going submarines assisted, perhaps, by hydroplanes, the high-powered rifles will, undoubtedly, be used to throw 12- or 14-inch common shell and shrapnel at the enemy. The submarine on the surface is visible to a battleship at from 12,000 to 14,000 yards, moderate gun range. Once visible, it can instantly be put under fire. Then it must either remain "light" and retain its speed or submerge. If it chooses the former course it will be subjected to a series of high-explosive shell salvos at a probable rate of one volley every 30 seconds. Since one hit is sufficient to demolish the strongest submarine, is it not likely that the boat's life under these conditions would be exceedingly short? If it chooses the alternative method of procedure, it will lose its chance of getting to torpedo range—4000 to 8000 yards. Moreover, since it takes about five minutes to

go from "light" to submerged condition, the boat is in imminent peril of being destroyed while going down. Five minutes under the concentrated fire of a dreadnought will seem like an eternity and will very probably lead toward eternity.

In a discussion of "The Future of the Submarine," appearing in the *North American Review* for October, 1915, Franklin D. Roosevelt states the case plainly as follows:

> The submarine has come to stay. It has taken its place, not as the sole weapon in naval offence and defence, but as an adjunct to other weapons. That it is useful for coast defence, for commerce destroying, for scouting purposes, and as a part of the protection to and attacking power of a battleship fleet is established. That it alone is capable of defending a coast against invasion is claimed only by the type of people in this country to whom national defence means preventing an enemy from landing an armed force on our Atlantic or Pacific seaboard—a Chinese wall kind of defence that requires necessarily the total abandonment of Alaska, of the Canal, of Hawaii and our other dependencies overseas, the stopping of our exports and imports and the inability to protect against aggression our citizens abroad and our well-considered international policies. In other words, free communications across the seas are just as much an integral part of our national defence as is the protection of New York harbor.

In the same magazine for the month of September, 1915, that eminent naval authority, Admiral Goodrich, writes:

> In one sense it may be said that this war is between the battleship and the submarine. The latter has certainly come to stay. It has lately taken on the rôle of a gun-vessel, in addition to that of a torpedo-boat. I have long known confidentially that it has been extensively used as a scout. The submarine has brought new problems into naval tactics, which must gravely influence the handling of battleships. It acts, however, under two disadvantages. Its invisibility is not entirely completed. It must at least lift its periscope above the water in order to recognize its target, and it is extremely vulnerable.

Finally, the general board of the navy, in its report dated November 9, 1915, after a brief but convincing analysis of the recent work of the submarine, asserts:

> Both in the North Sea and in the Mediterranean the submarine upon its first appearance scored heavily. Its high score was obtained by surprise; it was not due to inherent combative superiority.

And later on the board says:

> The submarine is a most useful auxiliary, whose importance will no doubt increase, but at the present time there is no evidence that it will become supreme.

But if the submarine cannot take the place of the dreadnought in the main battle line of our country, what may be said for and against the semi-submerged battleship, a by no means visionary craft, which has been discussed by naval officers here and abroad for years?

Lieutenant V. N. Bieg, U. S. N., in an article in the UNITED STATES NAVAL INSTITUTE PROCEEDINGS of January-February, 1915, describes a proposed heavily armored submersible as a ship with a hull designed mainly for surface running. "No provision for diving would be made." He says farther on: "Due to the fact that the hull would not be specially constructed to withstand the pressure encountered in deep water, it would be possible to build the ship any size, the only restrictions being the requirements for speed and the limit of power for oil engines. If steam were used, and with proper design this is possible, as has been proved in the *Katahdin*, this latter limit is not narrow." Reliance would be placed on invulnerability rather than on invisibility. He asserts that: "At practical torpedo ranges the angle of fall for large guns would be so small that an underwater run of projectiles would be exceedingly rare, and it is believed that even the largest shells impinging upon an almost flat armored deck would be ineffective, so that the nearer the submersible approached her enemy the more secure from attack she would become." In claiming this, Lieutenant Bieg forgets that it is a simple and economical expedient to increase the angle of fall of projectiles by decreasing the powder charge. He then goes on to show, "that with side armor extending only 6 feet below the surface when the ship is submerged, the protection afforded would be ample." But, even if the proposed submersible were equipped with 10,000-yard torpedoes, it would require side and deck armor 15.6 inches thick to resist the penetration of 12-inch, armor-piercing shells fired at that range. Moreover, it would clearly be at least as susceptible to torpedo attack from auxiliary submarines, destroyers and scouts as the surface battleship.

In *The Independent* of September 30, 1909, Park Benjamin outlines "The New Altrurian Battleship" as follows:

> Now the Altrurian vessel looked a good deal like a "whale back," such as one sees on the Great Lakes, only she was longer and narrower, say 500 feet in length and perhaps not over 30 or 40 feet in beam. Her deck, which curved over on each side, rose at the highest barely 3 feet above

the water and was armored. Nothing showed on it except a low conning-tower and a periscope tube, which, as is now common in torpedo-boats and submarines, projected the picture of her surroundings upon the whitened table in front of the helmsman far below the water-line. Her frames were of light but excessively strong steel, some one of the odd alloys which have lately been invented, and they were filled in with immensely strong but again light comprest paper pulp. Oil carried in her double bottom supplied the fuel for her tremendously powerful internal combustion engines, which drove a multiplicity of propellers, and gave her a speed of at least 35 knots per hour. Her sole armament was 10 fish torpedoes on each side, each delivered from a separate water-tight compartment, each capable of going straight for 4000 yards under water, and at a speed of perhaps 37 knots, and in the racks adjacent to each torpedo-tube were six spare torpedoes. The absence of guns and of all armor except the protective deck, together with the light construction of the hull, rendered it possible to give to the gas engines the high power noted, not only for a sudden dash, but for comparatively long periods of time, and while the vessel was driving ahead, a peculiar formation of her bow sent the sea over her for a depth probably sufficient to cause any projectile striking her at the necessarily low angle to glance and ricochet from her deck without penetration. The Altrurians found that they could build six vessels like that for the cost of one dreadnought, and that she needed for her management less than one-fifth of a dreadnought's crew. And because of her speed she could lie far off from the fleet and arrive close at hand at any desired moment, say in thick or foggy weather, or when the fleet was threading narrow straits, or otherwise navigating troublesome waters.

At the time the above was written this sounded, perhaps, phantasmagorial; but the subject has lately been brought before the people by Captain Sims, and it is possible that the near future will see a semi-submerged battleship in action. If so, it is likely to be as an adjunct to a great fleet; certainly not as the basis of that fleet.

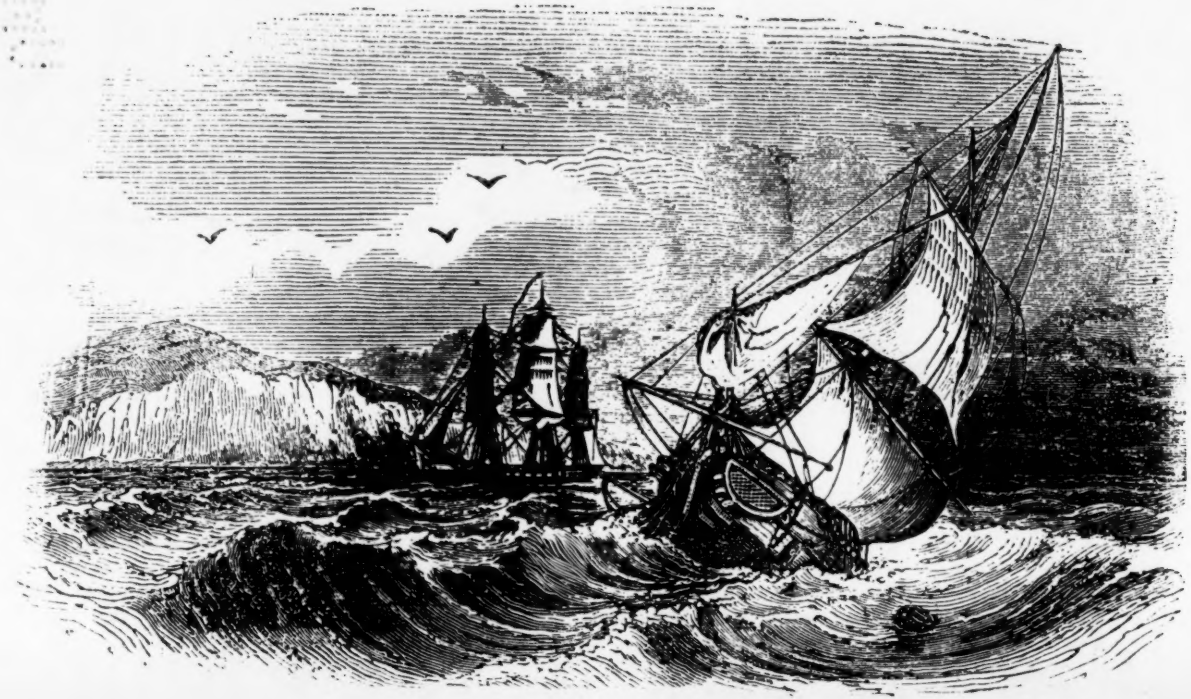
When compared with the battleship, the proposed undersea craft would seem to have three great disadvantages: It would be extremely uncomfortable. It would lack mobility. It would not be able to exert an overwhelming concentration of force at a particular tactical point. In addition, the cost would probably approach that of the large surface ship.

Comfort should not be a primary requisite of any man-of-war, but discomfort has a certain effect on the morale and health of the officers and crew that cannot and should not be disregarded. The care that Nelson exercised in providing for the health and happiness of the British crews before Toulon is said to have been largely responsible for the glorious victory of Trafalgar.

Mobility and concentration of force at a particular tactical point may be considered together since the latter depends in great degree upon the former. In spite of the great speeds claimed possible for the semi-submersible, it is difficult to comprehend how any vessel which has to overcome the resistance of water against its entire hull can attain a velocity through this fluid comparable to that of a ship traveling on the surface. With sufficiently powerful engines high speed is, perhaps, possible; but, as the demand for horse-power increases, so will the displacement grow. Displacement given to speed must be taken away from fuel and stores and living space, and from armor and torpedoes. In other words, rapidity of motion is acquired only at the expense of radius of action, defensive toughness and offensive energy. Concentrated strength in action requires: First, ability to force the fighting; next, preponderating power at the tactical point. The semi-submersible cannot fulfill both of these demands, therefore it is not logical to assume that it can take the place of the battleship.

The United States of America has certain ideals which it must preserve. These ideals comprehend definite national policies in which the people believe. Such policies must be upheld by far-sighted political action backed by force. Because of the character of some of these policies and because of the geographical position of this country, it is clear that the most effective implement of force is a powerful and well-balanced navy. The purpose of a navy is to exert pressure. It is here maintained that pressure can be best brought to bear by a fleet having for its mission in war 'to meet and destroy the main sea forces of the enemy.' The affirmation has been made that this mission can be most thoroughly accomplished if the body of the fleet is made up of the biggest of all-big-gun-ships. Proposed substitutes for this class have been considered under four general heads: The small battleship in the strict sense of the word, the fast cruiser or commerce destroyer, the submarine, and the so-called semi-submersible. Evidence has been put forth tending to show that, useful as these various classes of vessels may be when employed in an auxiliary capacity, they cannot be substituted for large battleships in the main fighting line. It is claimed that the great ship-of-the-line, from the early days of history, has justified itself when handled by commanders and men of skill and character. It is held that the lesson of the past should be the criterion of the future.

Consider the end—concentrated strength in action.



THE "PEACOCK" SUNK BY THE "HORNET"

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

OUR NAVY AND THE WEST INDIAN PIRATES

(CONCLUDED)

A DOCUMENTARY HISTORY

By REAR ADMIRAL CASPAR F. GOODRICH, U. S. Navy

The depredations on American commerce became less frequent than in preceding years; still, they did not wholly cease, for, on

March 10 the schooner *Planter*, of New-York, was taken off Neuvitas. Crew supposed to have been murdered.[1]

We also read that,

A piratical schooner is supposed to have been seen off the coast of North Carolina.[2]

We are fortunate in having a detailed report of the next occurrence:

U. S. STEAM GALLIOT "SEA GULL,"
THOMPSONS ISLAND, April 1, 1825.

Sir:

I have the honor to give you a detailed account of the late cruize on which I sailed from Matanzas immediately after the reception of your orders of the 19th ulto., taking with me the Barge *Gallinipper*.

At Stone Key I met his B. M. Ship *Dartmouth*, under the command of the Honble. Captain Maude; and was informed by him that some of his boats were there cruizing to windward in company with H. B. M. Schooners *Union* and *Lion*. Continued our course, and fell in with them the next evening at Cadiz Bay. As they were also in search of Pirates, but without any particular or certain information of their haunts, of which I was possessed, I deemed it proper to propose a co-operation; it being perfectly understood that I was to have the conducting of the enterprize. This proposition was cheerfully acceded to, and requesting that the schooners should not leave Cadiz Bay to windward within three days, I left the *Sea Gull* under charge of Lieut. Rudd and took with me, independent of the Barge, which was well manned, two small cutters with five men in each, and in company with a British Barge and two cutters under charge of

[1] MWHP. [2] N, 1825, Vol. XXVIII, 314.

Lieut. Ward of the *Dartmouth,* we made the westermost point of the entrance of Sagua la Grande; where we were detained 48 hours in consequence of strong head winds. The day after we arrived there, our water being nearly expended, the British Barge and *Gallinipper,* Lieut. Cunningham, sailed in quest of some, although it was blowing a heavy gale from the Eastward, and on the evening of the same day, the *Gallinipper* was capsized in a squall. But with the assistance of Lieut. Ward and his crew, our officers and men were saved and the vessel righted. She rejoined me with the intelligence of the accident a few hours after it happened, having lost part of her arms, ammunition and provisions. Notwithstanding this very serious misfortune, after pledging myself to procure provisions, we determined not to abandon the pursuit of our object, but upon the very last extremity; accordingly the next morning, the 25th ult°., the wind abating, we made another effort and gained the mouth of the river Sagua la Grande about noon. At this place I found a Fisherman and compelled him, much against his inclination, to pilot us to the Key of Justia Gorda,[3] one of the places of our destination, and at about 4 P. M., discried the Masts of a vessel, laying nearly concealed by the bushes under said Key. We immediately pushed for her, and when we approached within hail! she hoisted Spanish colours, and ordered us to keep off or she would fire into us, having her guns trained and matches lighted with which they made several ineffectual attempts to fire the Gun pointed upon the advancing Boat; the channel being very crooked and narrow, the boats grounded several times. At length one of the British cutters succeeded in passing the bar, and as two boats abreast could not approach, the officers and crews of the others were ordered to jump overboard and wade to the shore, where, taking a commanding position on the bank of the inlet in which she was anchored, and within twenty yards of her, I ordered her commander instantly to come on shore and not fire at his peril. After much hesitation and reiterated threats to fire upon us, he obeyed (by this time every one on board was in great confusion). Instead of coming to me, he and a man who had accompanied him, attempted to make their escape; the commander, however, was seized, but his companion fled to the mangrove bushes. I now directed him to order his colours to be hauled down, and to surrender his vessel and crew. He did order his colours to be struck, but at the same moment a musket or pistol was fired at the cutter, then close alongside, which was immediately returned, and a general fire insued; the leader of the band, availing himself of the confusion, attempted flight. I fired at and wounded him; he fell, but rising very soon and attempting to fight his way through our men with a long knife, he received several other wounds and was retaken. Many of the Pirates, in endeavoring to make their escape, by jumping overboard to gain the mangrove bushes, were shot, whilst others, seeing no chance of escape, were driven below by the boarders and musketry from shore.

On taking possession of her she proved to be a schooner mounting two six pounders on pivots, four large swivels and several blunderbusses and

[3] Not identified.

completely equipped for a complement of 35 men, which was the least number she could have had on board, as we took 19 persons and can account for 8 killed; several effected their escape into the mangrove bushes, and we are induced to believe that others were killed whose bodies are supposed to have floated out to sea unobserved, as there was a strong ebb tide. Among the prisoners are six wounded, one of whom is their chief, and calls himself Antonio Stepol. We were fortunate in having but one man wounded, a British Marine, who received a slight cut in the arm.

After securing the prisoners we searched the schooner, and discovered that with the evident intention of blowing us up they had placed lighted cigars in and near the magazines, which were soon carefully removed. We also found many articles on board of American produce (and to all appearances but recently taken), as the cases were quite new and clean, N. York hats, Shoes, Flour, Rice, Cheese, Butter, Lard, &c., &c., and to confirm their character, if there had been the least shadow of doubt remaining, we found the counterpart of these articles, concealed in a thicket about 20 yards from the vessel, which was approached by a meandering path, and could only be discovered by careful search, so cautious were they in their operations.

The following morning at daylight Lieut. Ward and myself took with us three Boats and proceeded to windward, leaving Lieut. Cunningham in charge of the Prize, Prisoners, &c. We soon after this discovered a large schooner-rigged "Regla Boat," gave chase and at 11 A. M. the crew finding we were gaining fast upon them, made for the nearest Mangrove Island, jumped overboard and effected a precipitate retreat to the bushes, leaving everything standing, with a keg of gunpowder open near the galley fire, and quantities of it strewn all over the vessel. The powder was instantly thrown overboard and the fire extinguished. She proved to be the boat whose crew murdered the five men belonging to the American Brig *Betsy*, that was wrecked on the Double headed Shot Keys in Decr. last.[4] After a long and ineffectual search among the Mangrove bushes for the fugitives, we took the Boat in charge and pushed on to the Key La Cosinera, whence they sailed from in the morning, being their place of resort and establishment. This we burnt and returned to Jutia Gorda at midnight, the officers and men being nearly exhausted, the latter having been at their oars from daybreak.

The schooner and boats being laden with the property found secreted in the woods and elsewhere, we set fire to the buildings on the Key, consisting of two very large Huts and some outhouses. At this place was an old man of more genteel appearance than the rest, whose situation was so suspicious that I thought proper to bring him with me. I have since discovered that he is the Commandant of Sagua la Grande, and in some way intimately connected with these pirates. His papers I transmit to you seperate (*sic*) from thos (*sic*) found on board the vessel.

Having distributed the prisoners on board the different Boats, we got underway together with the prizes, and sailed for Sagua la Grande, where

[4] *Vide supra.*

according to previous arrangement we met H. M. Schooner *Lion*, Lieut. Liardet, Comdg., who politely offered to receive the prisoners on board his vessel, to relieve us of the inconvenience of having them in deeply laden Boats and they were accordingly removed. We now continued our route to Cadiz Bay, rejoined H. M. Schooner *Union* and this vessel, reached Key Mona in company on the evening of the 29th ult°., where we found the *Dartmouth* still at anchor. Captain Maude, when informed of the capture in which his Boats had assisted, expressed a strong desire to communicate with you previously to the prisoners being disposed of for trial. I in consequence repaired to Matanzas to inform you of his wish, but finding that you had sailed for this place, I instantly returned to the *Dartmouth* and made application for the prisoners, upon which they were removed to this vessel.

I regret to have to add that in a heavy squall on the evening of the 30th the prize schooner parted both her cables, and having the "Regla Boat" in tow, they were both driven ashore on Stone Key and bilged. The property, however, was taken out the same night, and the greater part of it saved by the united efforts of H. M. Sch^rs. *Union* and *Lion* and this vessel, after which the wrecks were fired.

The handsome manner in which we were seconded by the officers and crew of H. M. Ship *Dartmouth* merits our highest approbation, nor can I in justice avoid mentioning the cheerfulness and alacrity with which Lieuts. Cunningham and Engle, Doc^tr. Dubarry and Mr. Barron (Secretary) and the men throughout performed their several duties; manifesting a degree of enterprize and zeal, amidst all their privations and fatigues, highly creditable to them.

I have the honor to be, with the highest consideration and respect, Sir,

Your obedient Serv^t.,

I. McKEEVER.

To Commodore Lewis Warrington,
Comdg. U. S. Naval Forces in the West Indies, &c.[8]

Another letter, from Thompson's Island, dated April 2, says:

The *Sea Gull* has just landed her prisoners, five of them dreadfully wounded with sabre cuts; among them is the captain, who fought resolutely; he has five wounds. On the 26th, the day after the above affair, the boats fell in with, captured and burnt another small schooner, the crew of which were the identical men who murdered the crew of the American brig *Betsey*, (of Wiscasset), the account of which excited so much just indignation throughout the country. The villains unhappily escaped to the Mangrove bushes. The chief officer of the port (Villa Clara), where the piratical schooner was fitted out, is among those taken. They state that they had a privateer's commission, and deposited $600. in the hands of the governor or commander of the above place, as security. One of the pirates taken is one of those who were reprieved at Jamaica not long since, on account of saving the life of lieutenant Hobson. The *Sea Gull* has on board the figure head of a vessel, which was found in the piratical schooner.

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[8] C. L., 1825, Vol. 3, No. 15.

Report says it belonged to the ship *Balize*, a trader between New York and New Orleans. I understand, from the officers of the *Sea Gull*, that the bodies of 13 unfortunate creatures were found tied to trees on shore; what vessel they belonged to has not yet been ascertained from the pirates.[6]

In addition to what is stated in the interesting letters from lieut. commandants Sloat and McKeever, we learn that the pirates, captured by the latter, have been given up to the captain-general of Cuba, who, it is believed, will promptly punish them; and that *seventeen* more have been sentenced to death in Porto Rico, and were to be speedily executed. The fact is, if piracy is to be suppressed, liberty must be granted, or *taken*, to pursue them on the land as well as on the water—and that, when the Spanish authorities shall fail to punish those captured on shore, self-preservation will require us to exert the right of doing it ourselves.[7]

It must have given Warrington great satisfaction to be able to address the Secretary of the Navy in this strain:

U. S. S. "JOHN ADAMS,"
THOMPSON'S ISLAND, June 5th, 1825.

Sir: . . . .

Since the capture made by the *Sea Gull*, we have heard nothing of pirates or their depredations. The *Grampus* has arrived from St. Thomas's, and her commander reports that there are no apprehensions entertained in that quarter.

The *Fox* was stationed for some time at Havanna, to give convoy to our trade, but was never called on for that purpose, although notice was regularly given. This shews the complete security felt at present. I have sent the *Spark* to the south side of Cuba, and shall order the *Grampus* to the same place as soon as she refits. I have no doubt they will effectually protect our commerce on that coast.

I am, Sir,
With Great respect,
Your ob. Servant,
L. WARRINGTON.

The Honourable
Secretary of the Navy.[8]

About this time he was joined at Key West by the *John Adams*, Captain J. J. Nicholson, and the *Constellation*, Captain M. T. Woolsey. The former arrived at this place on May 28, and the latter on June 14. On the 22d, Warrington reports the *John Adams*, the *Spark*, the *Terrier* and the *Grampus* cruising off Cuba in various parts. Things were now very quiet on his station.

[6] N, April 23, 1825. [7] N, April 30, 1825. [8] C. L., 1825, Vol. 4, No. 1.

Warrington sent from the *Constellation*, off Havana, to the Secretary of the Navy, on August 29, copies of all the reports from his captains. He added,

If pirates are now or have been in force lately on either side of Cuba, they have not only abstained from making captures, but they have concealed themselves so effectually as to prevent detection. The orderly conduct of fishermen on the coast, the steady pursuit of their occupation and absence of all suspicious persons induce a belief that there outlaws are not at present collected in any force. I shall, however, keep a watchful eye on the island and prevent, if possible, the commission of depredations which may be attempted, under a belief that we are relying too much on appearances.[9]

Changes about this time in the headquarters of the West Indian squadron are noted officially, and a gratifying report of affairs is rendered, especially as to the health of the personnel.

NAVY DEPARTMENT, Dec. 2, 1825.

The secretary of the navy[10] respectfully submits to the president of the United States the following statements respecting the concerns of the navy department, during the present year.

The West India squadron now consists of the frigate *Constellation*, corvette *John Adams*, sloop *Hornet*, brig *Spark*, schooners *Grampus*, *Shark* and *Fox*, and the storeship *Decoy*, with the barges. The duties assigned to it have been signally accomplished. Several captures of pirates were made, in the early part of the year, of which the documents annexed furnish an account. Since that time, the principal places where piracy existed, have been diligently watched, and no complaints have been made, to the knowledge of the department, for several months past.

Captain Warrington, an active, systematic, and enterprising officer, commands in that quarter, and, seconded as he is, by a commendable zeal and skill in his subordinate officers; it is believed that he will continue to repress that evil, which has, heretofore, produced so much anxiety and distress.

There have been thirteen deaths among the officers attached to that squadron, occasioned by diseases contracted either in the vessels or in the ports of the West Indies.

Against the danger from this cause, the commanding officer was particularly instructed to be upon his guard, and has, no doubt, been attentive to his orders: but severe exposures are incident to the service, and where so many officers are subjected to them, it must be expected that they will prove fatal to some; especially to those who are not very cautious in guarding their health. We have been, however, so far fortunate, as to suffer less, from this cause, in the present than in the preceding years, arising probably, in part, from a change in the size and character of the vessels employed; and steady attention is paid to the subject, and such arrangements made, as give the best hopes of lessening the evil. Although sickness has prevailed at Thompson's Island to a distressing extent, it has been less

[9] N, September 17, 1825. [10] Samuel L. Southard.

severe than heretofore. Two officers have died there, and their deaths are probably not to be attributed solely to the climate.

The station at that place having been found unhealthy, a surrender of the buildings occupied by the war department, at Pensacola, was obtained for the purpose, and arrangements made early in the spring, for the removal of the stores &c. to them. An order for the transfer was issued on the 24th of May, to be sent by the *Decoy;* but an unexpected accident delayed the sailing of that vessel until the 13th July, and she had an unusually long passage of between forty and fifty days. The transfer has since been made, and Pensacola is now the rendezvous of the squadron, and will continue so: the site for a navy yard and depot having been selected, at that place under the act of Congress, entitled "an act authorizing the establishment of a navy yard and depot on the coast of Florida, in the Gulf of Mexico."[11]

The President, in his annual message, praises the work of Captain Warrington and of his officers and men:

The objects of the West Indies squadron have been, to carry into execution the laws for the oppression (*sic*) of the African slave trade; for the protection of our commerce against vessels of piratical character, though bearing commissions from either of the belligerent parties; for its protection against open and unequivocal pirates. These objects, during the present year, have been accomplished more effectually than at any former period. The irregular privateers have, within the last year, been in a great measure banished from those seas; and the pirates, for months past, appear to have been almost entirely swept away from the borders and the shores of the two Spanish islands in those regions. The active, persevering, and unremitted energy of Captain Warrington, and of the officers and men under his command, on that trying and perilous service, have been crowned with signal success, and are entitled to the approbation of their country. But experience has shown that not even a temporary sustension (*sic*) or relaxation from assiduity can be indulged on that station without reproducing piracy and murder in all their horrors; nor is it probable that, for years to come, our immensely valuable commerce in those seas can navigate in security, without the steady continuance of an armed force devoted to its protection.[12]

Piracy in the West Indies, while not wholly stopped, was decidedly on the wane, thanks to the unremitting exertions of our navy. The newspapers pay this encouraging tribute to those who sought to eradicate the evil: "No acts of piracy have lately been heard of. Vigilance has given security."[13] The snake had been scotched but not killed; the fire had been largely put out but smoldering embers yet remained to burst into flame again when the conditions favored.

[11] RSN; N, December 24, 1825.
[12] J. Q. Adam's First Annual Message, December 6, 1825.
[13] N, November 5, 1825.

1826

The closing years of the period under consideration may be rapidly passed over as relatively barren of incidents.

During 1826, a very much reduced force was maintained in the West Indies. It appears to have consisted of:

	Guns	
Frigate *Constellation*	36	Captain M. T. Woolsey
Corvette *John Adams*	24	Captain J. J. Nicholson
Sloop *Hornet*	18	Mast. Comdt. S. Woodhouse
Schooner *Grampus*	12	Lieut. J. Cassin
Schooner *Shark*	12	Lieut. Otho Norris
Brig *Spark*	12	Lieut. J. T. Newton

the whole under the command of Captain Lewis Warrington.

Piracy having been largely put down, his object was to keep it down.

Under date of January 6, 1826, Woolsey writes to him from Matanzas:

> I have made strict inquiries but can hear of no piracies or piratical establishment and I believe that a *show* of force is all that will be required to prevent a recurrence of it.[14]

Nevertheless, elsewhere we read,

> It seems that the pirates of Cuba have again commenced their depredations. It is believed that they have robbed two vessels and murdered all hands. The pardoning power has been much abused in respect to these wretches as well in the United States as in Cuba and our gallant seamen must be exposed to the perils of another season on that coast that they may be kept in their caverns. If caught, however, and convicted, our present chief magistrate will not grant them a respite that they may commit new murders.[15]

The situation was well in hand, however, with the *John Adams* cruising on the south side of Cuba and the *Hornet* on the north side watching old Bahama Straits, Matanzas and the Double Headed Shot Keys. Warrington writes from the *Constellation* at Pensacola that

> no piracies have been committed since my last letter. Depredations on our commerce are fortunately unheard of where they were formerly so frequent.[16]

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[14] C. L., 1826, Vol. I, No. 15.

[15] N, February 25, 1826. [16] N, August 10, 1826.

President John Quincy Adams makes brief but encouraging mention of the subject in his annual message of December 9, 1826:

> The piracies with which the West India seas were for several years infested, have been totally suppressed.[17]

Succeeding presidents are silent on the subject—a most encouraging sign.

1827

Sometime during the first half of the year 1827 (the exact date not being specified), a pirate was captured in the Southwest Pass by a revenue cutter, the former having sent a boat, with 13 men, to intercept the *Isabella*, from Vancouver to New Orleans. This proved to be the Colombian vessel *Bolivar* which had previously captured the American schooner *Antoinette*. It was in charge of the first lieutenant, the captain disowning all knowledge of such capture, "but it seems as if he had remained on shore to collect intelligence as to vessels worth *privateering* for." The Court of Admiralty condemned the *Bolivar* for firing on an American vessel with intent to plunder.[18]

The *Antoinette* was retaken at the Southwest Pass where she went for provisions. When boarded by the pilot, the latter suggested to the former captain a scheme for her recapture, which was carried out successfully.[19]

In the case of the *Antoinette*, of the $2500 salvage decreed to pilots, $1000 went to Pilot Mathews. Had Captain Bateman, of the *Antoinette*, put in a claim, he would have been awarded a larger amount.[20]

1828

As in the preceding year, there is but one mention of piracy during 1828. The schooner *Charles* of Philadelphia was captured near Xagua,[21] Cuba, by a band of pirates, and the captain and crew murdered.[22]

Active operations were practically ended in West Indian waters for our squadron, but it was maintained there for several years lest the pirates forget the lesson which had been taught them.

[17] PG, 1826. [18] N, June 2 and 9, 1827. [19] N, June 16, 1827.
[20] N, July 7, 1827. [21] Sagua la Grande. [22] N, July 12, 1828.

In December, 1828, occurred an incident that showed the necessity for it. In this year the 18-gun sloop of war *Erie*, Master-Commandant Turner, was ordered to convey General William Henry Harrison, minister to the United States of Colombia, to that country. Touching at the island of St. Bartholomew, Master-Commandant Turner met the privateer *Federal*, belonging to Buenos Ayres, and learned that she had recently captured an American vessel under the plea that she had Spanish property aboard. The governor of the island was asked to surrender the *Federal*, which had run under the guns of the fort, and on his refusing to do so a boat party, led by First-Lieutenant Josiah Tattnall, of the *Erie*, was sent against the privateer. Setting out on a dark night, and favored by occasional rain squalls, the Americans pulled with muffled oars into the harbor unobserved and carried the *Federal* with little opposition. Some difficulty was experienced in tripping the anchor, and during the delay the fort opened a heavy but ill-directed fire. The privateer was finally got under way, and in a few minutes was brought safely out of the harbor. No loss was sustained on either side. The *Federal* was sent to Pensacola.[23]

1829

A fresh outburst of piracy, although on a small scale, occurred during 1829, necessitating renewed activities on the part of the squadron.

In the month of February, 1829, only a few years previous to the capture of the *Mexican*, the brig *New Priscilla*, of Salem, Captain Hart commanding, was found apparently abandoned a short distance out from Havana, but the finding by the boarding party of a young Salem boy spiked to the deck told a too-often repeated tale.[24]

This recrudescence of crime caused earnest appeals to the Navy Department, which was able to make a reply calculated to dispel undue alarms.

A number of underwriters and merchants of this town (Boston) addressed a letter to the secretary of the navy making a representation of the late piracies in the West Indies, and requesting that some protection might be afforded to our commerce in those seas. To this application they received the following reply, which shows that the government had already directed their attention to the subject. (*Bos. D. Adv.*)

"NAVY DEPARTMENT, March 23, 1829.

"I have received your communication, dated the 17th inst. in relation to the atrocious murders and piracies recently committed near the island of Cuba.

"The executive was informed of those depredations several days since; and measures were immediately taken, which will, it is hoped, prevent a recurrence of similar atrocities, and afford ample protection to our com-

[23] M, II, 40. [24] BMS, 43.

mercial interests as well as to the lives of our citizens, engaged in honest trade with the West Indies and the Gulf of Mexico. I am, very respectfully, &c.,

"JOHN BRANCH.

"C. W. Cartwright, esq.,
and other underwriters and merchants, Boston."[25]

The Governor of Matanzas makes proclamation (moved by the affair of the American brig *Attentive*)[26] offering large sums of money in reward for capturing pirates—$5,000 for a piratical ship and ⅔rds of the crew; $2000. for the vessel alone, and $250. for each pirate of said vessel.[27]

There were quite a number of pirates hanged during April and May at St. Thomas,[28] though whether or not owing to the lure of the reward offered I am unable to say.

In spite of measures such as above mentioned, we may estimate the real extent of the menace to shipping from the bald statement that the *Hornet,* Norris, and the *Grampus,* Voorhees, sailed from Havana, on the 6th of May, having a number of American, English and French vessels under convoy. The *Shark,* Adams, left Havana on the 4th of May on a cruise, and the *Erie,* Turner, arriving at Pensacola on April 28, reported that her boats had been out continually in pursuit of pirates.[29]

The year closes with many crimes and many punishments, as indicated by the newspapers, which report that "numerous cases of piracy have occurred recently in the neighborhood of Cuba. Several of the gang have been apprehended and are now awaiting the penalty of their crime."[30] Seven pirates were shot at San Juan, Porto Rico, some time during December.[31]

1830 and after

Brief and unsatisfactory references to the pirate brig *Orbit* make up the story for 1831:

Peacock, McCall, arrived at Boston from Havana, lately, with two of the pirates of the brig *Orbit.*[32] Two more of the same to be hanged July 1st in Boston.[33]

In 1832, an instance of piracy occurred about 400 miles southwest of the Azores. Strictly speaking it does not come within the scope of this study and is only mentioned because it is the

[25] N, April 11, 1829. [26] *Vide* Introduction, p. 14.
[27] N, April 18, 1829. [28] N, April 4, 11 and May 9, 1829.
[29] N, May 30, 1829. [30] N, October 25, 1829. [31] N, December 26, 1829.
[32] N, April 30, 1831. [33] N, June 18, 1831.

last one on record as having been carried out in the North Atlantic.

The pirates, mentioned yesterday, as having arrived at Salem, have been examined by the U. States district attorney, removed to jail in Boston, and are to receive their trial in October. The prisoners are sixteen in number, and belonged to the piratical schooner, *Pinda,* which robbed the brig *Mexican,* of Salem, on the high seas, nearly two years since. The commander of the *Pinda* is one of the prisoners.

Of the sixteen, fourteen were on board the *Pinda,* at the time the piracy was committed. The other two joined her on the coast of Africa. The prisoners are principally Spaniards, and belong to Havana—there are no Americans or English among them.

The robbery committed upon the *Mexican* was most audacious and cruel. She was bound to Rio Janeiro, and was plundered under Brazilian colors, on the 20th September, 1832, lat. 33, long. 34 30, and robbed of $20,000 in specie, the officers and crew stripped of every thing valuable, fastened below, and the vessel set on fire with the horrid intention of destroying her with all on board. Captain Butman and his men succeeded in getting on deck through the scuttle which the pirates had left unsecured, extinguished the flames and returned home.

The pirates were subsequently taken by the British, and have had an examination in England before the proper authorities, when five of them offered to turn king's evidence—two of them were admitted to testify. They were fully committed, and the British government ordered them to this country for trial. They were yesterday landed in Salem, examined before judge Davis, and ordered to take their trial in Boston.

The most cursory reading of these pages, in which the actors in the various episodes, mostly of a tragic nature, are allowed to speak for themselves, must make evident these facts: first, the courage, fortitude and perseverance of the officers and men of the United States Navy to whose lot fell the task of putting a stop to piracy in West Indian waters; second, the dangerous climatic and morbific conditions under which they labored; third, their resourcefulness in making full use of every craft and weapon that came into their hands, whether suitable or no; fourth, the inadequacy both in quantity and quality of their equipment; fifth, the paralyzing effect of the home government's attitude which, always in the background, was most clearly shown in the case of Porter; sixth, the difficulty of carrying on their work against the latent or active opposition of the Spanish authorities and without the earnest support of their superiors at the national capital. Never did sailors undertake a more heartbreaking, more discouraging campaign and never did sailors reach more creditable results.

Since these facts, abundantly established by the record, form in themselves a splendid monument to the bravery, tact and skill of the men whose names occur in this story, it would be painting the lily to seek to add to their fame by any eulogy on my part. In the presence of such achievements as theirs I am quite content to preserve a reverent silence.

THE END.

SELECTIVE RADIO STATIONS

ABSTRACT OF AN ARTICLE BY

A. ARTOM

ON A GENERAL METHOD FOR MAKING RADIO STATIONS SELECTIVE.[1]

Free translation by PROFESSOR L. A. DOGGETT, U. S. N. A.

The author first of all refers to his earlier studies on selectivity, which is obtainable in radio stations, by making use of particular forms of aerials. It is well known that with an aerial differing from that of a simple vertical antenna and in general with any geometric shape of aerial differing from that of a surface of revolution around the vertical axis, the polar diagram which rep-

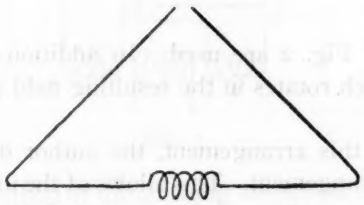


Fig. 1

resents the radiation of energy from the secondary horizontally is not a circle but a curve in which the radius vector will be different for the different horizontal angles. One quite simple form of selective aerial is shown in Fig. 1, consisting of a triangle situated in one plane and open at the top. With the dimensions used nowadays, which are ordinarily proportioned in relation to the length of the wave, such an aerial transmits and receives with the greatest intensity in the direction of the plane in which it lies,

[1] Published in L'Elettrotecnica, April 27, 1917.

with practically zero intensity in the direction perpendicular to itself, and with an intermediate intensity in other directions.

It is also known that by using a number of selective receiving aerials, an E. M. F. will be set up in each of them, this E. M. F. being a function of the angle between the plane of the aerial and the direction from which the signals come. By making circulate currents (induced by such E. M. F.'s in each of the aerials) in coils suitably placed, a single resulting field can be obtained, the direction of which, revealed through the medium of a movable coil connected with a detector, makes possible the determination of the direction from which proceed the signals. The author gives for this method a quite simple and convenient arrangement. In this method two perpendicular aerials including in circuit the two

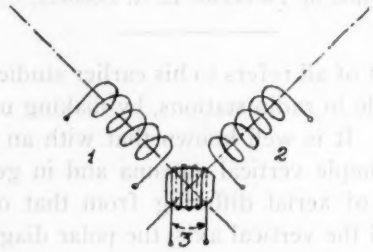


Fig. 2

coils, 1 and 2 of Fig. 2 are used. In addition there is a third movable coil, which rotates in the resulting field and is connected to the detector.

In addition to this arrangement, the author describes another more complete arrangement. This allows of the use not only of the principle of the composition of the magnetic fields produced by the currents circulating in the single triangular aerials but also of the principle of differential action to which recourse is often had in radio work in attempting to eliminate disturbances. The arrangement in question requires the use of four triangular aerials, *AA, BB, CC, DD,* the horizontal projection of which is represented by Fig. 3.

Each of the aerials, besides having the ordinary means of tuning (variable self-induction and capacity, not shown in the figure) terminates at two diametrically opposite points on a winding in the form of a toroid with non-magnetic core. In this winding occurs the superposition of the currents induced in the single

aerials, and the composition of the magnetic fields is produced. By connecting the primary, 1, which acts on the receiving circuit, 3, to a pair of brushes, MN, diametrically opposite and movable around the periphery of the toroid, it is possible to find the diameter at which the reception of useful signals occurs with maximum intensity and deduce the direction from which proceed the waves. At the same time using another pair of brushes, R and S, connected with another primary, 2, which also acts on the receiving

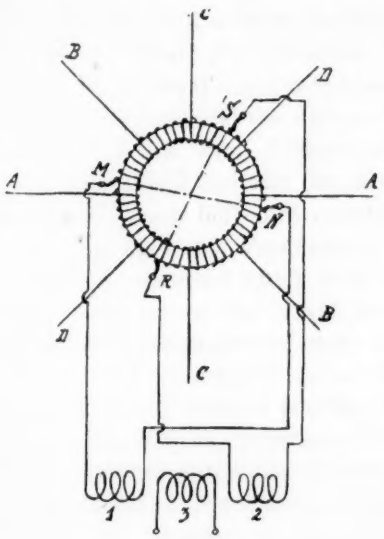
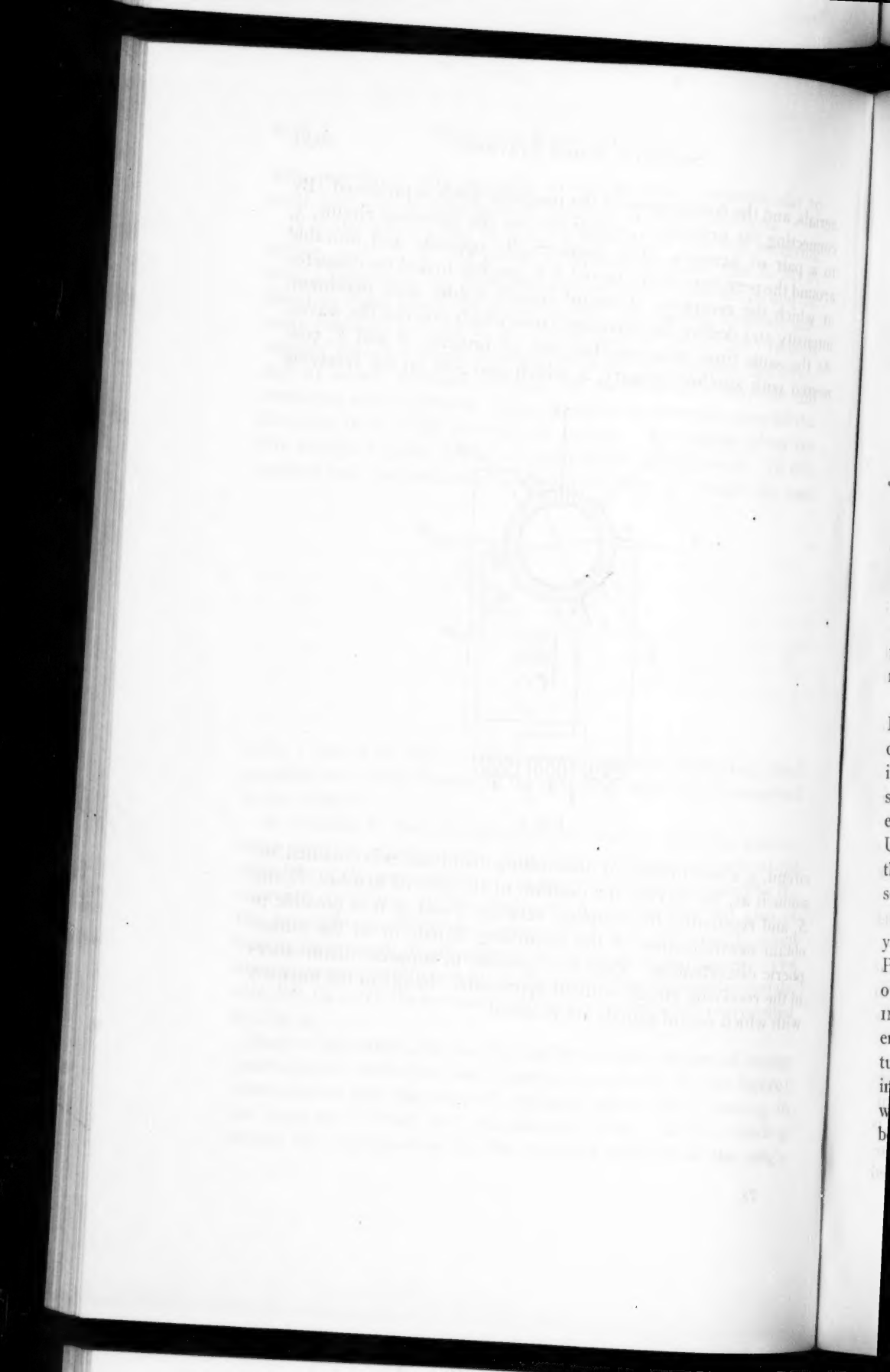


Fig. 3

circuit, 3, a new method of diminishing disturbances is obtained, inasmuch as, by varying the position of the pair of brushes, R and S, and regulating the coupling between 2 and 3, it is possible to obtain neutralization of the disturbing signals or of the atmospheric disturbances. Thus it is possible to suppress disturbances in the receiving circuit without appreciable change in the intensity with which useful signals are received.



U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

The Institute

The Institute has experienced a very encouraging and gratifying increase in membership during the past year but the great influx of new members naturally expected as a result of the enormous expansion of the Naval Service has not as yet taken place.

We submit that hand in hand with the teaching of the technique of the naval profession should go instruction in service ways of thinking, service habits, general naval developments, the progress and lessons of naval warfare, and the diplomatic relations which affect or are affected by the war. Officers responsible for this development and training will find that the stimulation of interest and enthusiasm will be greatly helped by membership in the Naval Institute or by subscription to the PROCEEDINGS.

The Institute presents material which is of general and educational interest to every one in the Naval Service and for that reason alone claims the active support of every officer in the service.

When it is recalled that the net proceeds of the Institute's Book Publication Department are devoted entirely to the maintenance of the quality of the PROCEEDINGS or returned to the entire service in the reduction of prices of books and manuals, it will be understood that "the advancement of professional and scientific knowledge in the Navy" still continues as the primary object of the U. S. Naval Institute. The Institute is a mutual company in which the profits are divided not only among its 3500 members and subscribers but also among the entire personnel of the Naval Service.

The PROCEEDINGS are published at a loss of about $5000 per year and with the low membership dues it is not expected that the PROCEEDINGS can ever become self-supporting. A great increase of membership can, however, bring the receipts for the PROCEEDINGS to such a point that the expenses will be almost balanced, enabling still greater reductions in the selling prices of the Institute's Publications. An increase of membership means also an improvement in the quality of the PROCEEDINGS because of the wider literary field and greater quantity of material which will be placed at the disposal of the Board of Control.

The Institute claims for its own:

All commissioned officers of the Navy and Marine Corps, including those of the Coast Guard, Naval Militia, and Naval Reserve on active duty, as regular members.

All officers of other arms and branches of the U. S. Service and civilians interested in the naval service as associate members.

All enlisted men of the regular service as subscribers, the subscription being the same as dues for members.

Members are earnestly urged to lend an active hand in the expansion of the Institute by doing missionary work among the officers of vessels and stations who are not members and among the enlisted men who, though interested in the work of the Institute, are not subscribers.

Personal responses by officers interested in this matter will be greatly appreciated by the Secretary as it is practically impossible to keep in touch with individual members now that the publication of the monthly Register has been discontinued.

Book Announcements

The Naval Electrician's Text-book, Bullard; revised and rewritten by officers of the Department of Electrical Engineering, U. S. Naval Academy. Volume I, September 15. Volume II, August 1.

The Watch Officer's Manual, Hovey; revised, brought up to date, and greatly enlarged by Lieutenant S. Endel, U. S. Navy. September 1.

Mechanical Processes, Danforth, has been revised by its author and will be republished, October 1.

The Recruit's Handy Book, Fullam; revised, corrected to conform with present regulations and instructions, and considerably enlarged, September 30.

Naval Construction, Robinson, is also undergoing revision and a new edition is announced for October 1.

Navigation and Compass Deviations, Muir, will be revised and all problems and solutions brought to accord with the new form of the Nautical Almanac. This revision has been undertaken by Mr. G. W. Littlehales and will be published in November.

Suggestions Invited

Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited

to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that any one who can spin such a yarn will submit it.

Membership

Since July 16, 1917, 38 regular and 7 associate members have joined the Institute.

Deaths: Rear Admiral Stephen B. Luce, U. S. Navy; Lieutenant Colonel T. C. Prince, U. S. Marine Corps; Lieutenant A. Marcus, U. S. Navy.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers. Bills will be rendered upon delivery of books.

Illustrations

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Annual Dues

The annual dues for 1917 became payable on January 1, 1917. It is suggested that dues be paid in lump sums covering a period of two to five years; this method of payment has advantages for members as well as for the Institute and is practiced by a number of members, both regular and associate. Response to this notice will save the Institute a considerable sum in stationery and postage.

In case of death or resignation, dues paid in advance, except for current year, will be returned to estate or individual.

Notice

Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

Address of Members

All members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS *are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of station are not now available for the use of the Institute's staff.

Non-receipt of Proceedings

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

ANNAPOLIS, MD., August 18, 1917.

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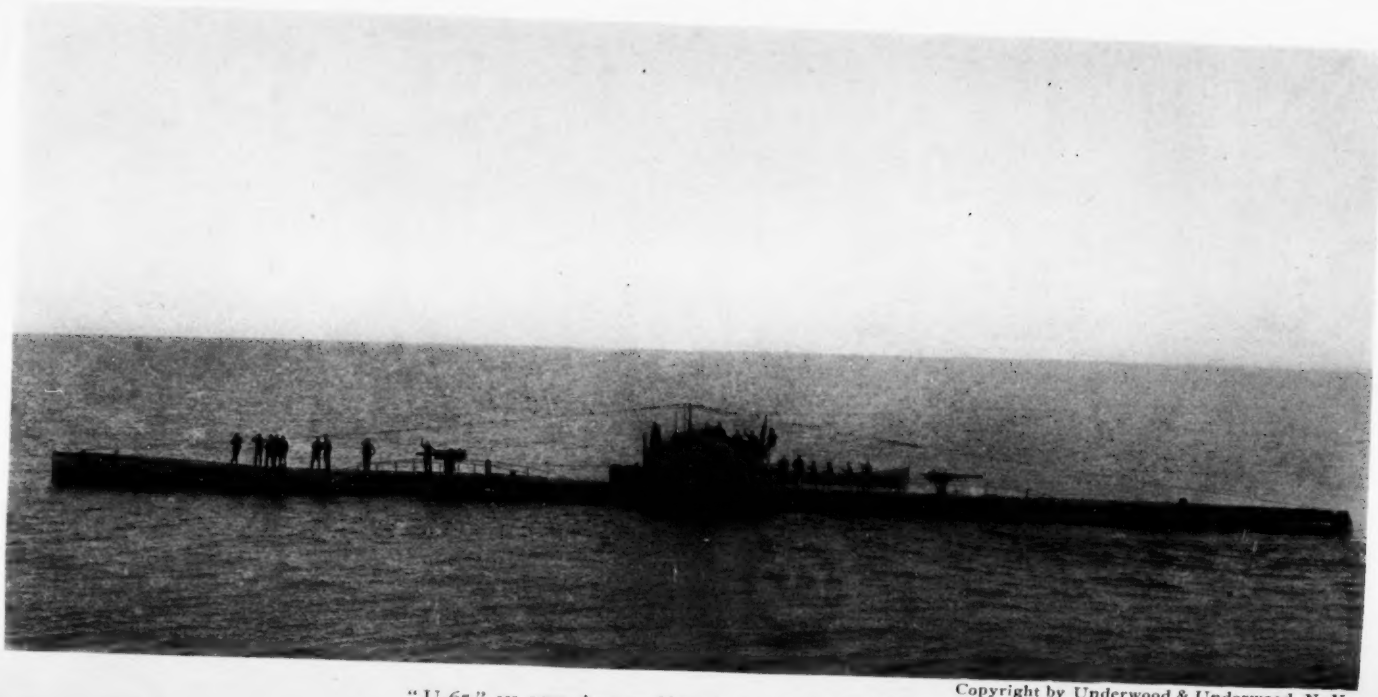

"U-65" IN THE ACT OF HOLDING UP A LINER AT SEA

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"U-65" IN THE ACT OF HOLDING UP A LINER AT SEA

PROFESSIONAL NOTES

Prepared by LIEUTENANT I. C. KIDD, U. S. Navy

GENERAL ARRANGEMENT

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NOTE.—Ship construction in the nations at war is held confidential and no reliable information is available.

FRANCE

DIRECTOR OF SUBMARINES.—Rear Admiral Salaun, commanding the naval division of the Expeditionary Corps of the Army of the East, has been made director of submarine warfare.

Rear Admiral Marveileux du Vignaux, who has held the post of director of submarine warfare, will take Rear Admiral Salaun's place in the eastern theater.—*N. Y. Times,* 13/8.

GERMANY

TWO HUNDRED U-BOATS IN COMMISSION.—A Washington despatch to the *N. Y. Times,* dated July 27, said:

"In a well-informed official quarter the statement was made July 27 that the best available information in the possession of the government, based on reports from abroad, indicates that Germany now has in operation against Entente and American shipping not more than 200 submarines.

"This estimate is below that of laymen who have been studying the situation, and is 100 submarines lower than the total number of U-boats that Count von Bernstorff predicted Germany would have on the firing line

of the submarine zone. He asserted that within a month after the beginning of submarine warfare on an unrestricted scale the German Admiralty would send 300 U-boats to the waters around the British Isles, and that these would be sufficient to starve England within a month. This prediction of the former German ambassador, made in the presence of a number of newspaper men toward the end of last February, has gone woefully wrong.

"The source of the official statement as to the number of Germany's submarines cannot be disclosed, but is highly reliable. From the same source the statement was obtained that Germany is turning out three or four new submarines a week, and that the number of submarines destroyed or put out of commission by the Entente Allies is about one a week. Every effort is being made to co-ordinate the plans of the British, French, and American navies for checking this increase in the number of U-boats, while plans are being made for coping with the entire menace.

"Germany is turning out several kinds of submarines. Reports that 5000-ton U-boats are being used are not regarded seriously by naval officials. The largest German submarines thus far encountered are of the 1200-ton type. They are armed with two 5-inch guns and operate in the Atlantic and off the Irish coast.

"A smaller type of submarine is being used in operations along the trade routes of the North Sea from bases at Zeebrugge, on the Belgian coast, and German naval bases. There is an intermediate type, like the *U-53*, and a special type of mine-laying submarine. The *U-53* class is speedy and is employed mainly on the steamer lanes between this country and Europe, between the British Isles and Russia, and in the Mediterranean."

THREE HUNDRED-FOOT SUBMARINES.—The officers of a Dutch freighter which arrived at an American port from Holland reported that the vessel was stopped on June 22 off the Norwegian coast by one of the latest type of U-boats which they declared to be at least 300 feet long.

According to the Dutch officers, the submarine had one 4-inch gun mounted forward and another at the stern, two smaller quick-firing guns abreast of the conning-tower and two more on the quarter aft. The officers heard that she carried a crew of 90 and could steam 20 knots on the surface and 14 knots under water.

It was stated that the German submarines were keeping closer in toward the Norwegian coast and not venturing so far out in the North Sea on account of the nets, mines, trailing drags and other devices for their capture or destruction.—*N. Y. Times*, 17/7.

HOLLAND RELEASES U-BOAT.—An Amsterdam despatch dated August 3, says:

"A semi-official statement received from Berlin says that as a result of an investigation by the international commission at The Hague, the German submarine *UB-6* will remain interned in Holland and the *UB-30* will be released."

The German submarine *UB-30* stranded on the Dutch island of Walcheran last February. It was disarmed and interned at Flushing. There are no available records concerning the *UB-6*.—*Washington Post*, 4/8.

GERMAN CONTROL OF DUTCH STEAMSHIP COMPANIES.—In the course of an action brought by a British firm against Naamloov Vernootschappi Handels-en Transport Maatschappij Vulcan (of Rotterdam); Gewerkschaft Deutscher Kaiser (of Hamburg); Aktiengesselschaft Fur Huttenbetrich (of Germany); and Messrs. Thyssen and Co., it was submitted in evidence that the Dutch company, though registerd in Holland, was managed by a number of directors who acted under the supervision of what was called a "supervising committee," this latter body consisting wholly of German

directors of the Kaiser Co. Almost the whole of the shares were owned by the latter company, and the two managing directors of the Vulcan Co., who were of German nationality, though resident in Rotterdam. So close was the supervision of the German parent body that it was even impossible for the Dutch company to increase the wages of any of its staff except with the consent of the German company, which also had the right to nominate the chairman, deputy-chairman, and secretary of the Dutch concern.—*Shipping Illustrated,* 11/8.

GERMAN COMPETITION IN SHIPPING.—The future of British shipping almost means the future of the British Empire, and depends upon two factors; the character of foreign competition and our efforts to meet that competition. For this reason the bill for the restoration of the German mercantile marine, presented to the Reichstag a few days ago, merits special notice. It is clear that the Germans intend, if possible, to renew their subsidization policy. It is for us, in conjunction with our Allies, to consider what measures are to be adopted to meet the enemy's designs. German subsidized competition, it must be understood, is not ordinary commercial rivalry, but trade war—organized, bounty-fed, undercutting, deliberately designed to ruin the trade of other countries.

In a statement explanatory of the new bill emphasis is given to the importance of Germany being able to resume its world-trade and world communications immediately after the war. It is stated that the mercantile marine cannot meet the requirements of the country without financial help from the state. It is observed that German merchant shipping aggregated a gross registered tonnage of more than 5,000,000 tons before the war; that more than 2,000,000 tons have fallen, or are likely to fall into enemy hands; that more than 1,000,000 tons are locked up in the ports of Germany's Allies or of neutral states; and that owing to the rise in prices, new construction undertaken at the risk of owners would not be likely to pay. It is further pointed out that German shipping has been completely paralyzed for the period of the war; that shipowners in other countries are making the utmost efforts to increase their tonnage and to invade what have hitherto been German spheres of business; and that in these efforts foreign shipping is in a particularly favorable situation, for the reason that during the war, thus far, it has made great profits, and is consequently in possession of very large reserves. Moreover, foreign shipping is being powerfully supported by the respective governments. The United States of America and Japan, in particular, have enormously increased their fleets and business.

By the new bill German shipowners are to be paid direct subsidies, graduated according to the speed at which they can complete their new tonnage. For example, the subsidies may amount to from 60 per cent to 80 per cent of the peace value if the ship is put into commission within three years after the conclusion of peace; to from 40 per cent to 60 per cent if commissioned between the fourth and sixth years after the end of the war; and to from 20 per cent to 40 per cent if the vessel is put in commission between the seventh and the ninth years after the conclusion of peace. Subsidies will also be granted to meet the costs of internment of German ships abroad, and grants will be made to ships' crews who have lost their personal possessions, these grants ranging from a minimum of 12l. 10s. to a maximum of 175l. for captains of passenger ships.

A year ago, the German Government, upon representations from the shipowners, promised to make loans in aid of new construction, up to a total amount of 15,000,000l. The shipping companies protested that such loans would not enable them to take the risk of building new ships at war prices. The government then promised to guarantee the interest on new capital invested by the shipping companies. As a result the larger of the concerns decided to increase their fleets. The Hamburg-Amerika Line ordered 350,000 tons of new ships, and the Norddeutsche Line 260,000

tons. Many of these vessels are now in an advanced stage of construction. But many of the smaller companies felt themselves in too weak a financial position to make contracts. Now that the United States has come into the war the whole position has been reviewed in the light of this new circumstance, and the above bill already referred to is the outcome. Thus we see the promise of the most generous—not to say extravagant—state subsidization scheme ever seriously propounded. If this scheme materializes we and our Allies are in for cut-throat competition. Surely the publication of the terms of this bill will convince even the most generously disposed of the imperative necessity of adopting combative measures against German commerce as well as against German militarism.

Not less notable than the financial provisions of the new bill are its clauses prohibiting sale to, or trade with, aliens under certain conditions. Ships constructed or repaired with the aid of subsidies may not be sold to foreigners during a period of ten years after they are put in commission, nor may any chartering or freight contracts affecting such ships be concluded with aliens during ten years without a government license. How Germany may manipulate her shipping and shipping laws will depend largely, if not mainly, upon the terms of the coming peace treaty and the other measures we take (or neglect to take) for the preservation of our own shipping interests. It would be more easy to venture a forecast of the broad, general terms of the treaty than to predict how shipping in particular will be affected. There is just a danger that in the larger issues of peacemaking the real interests of our shipping may to some extent be neglected. If, after the war, we are to give free and unrestricted scope to German subsidized competition, there is no telling to what extent it may be carried. It may prove not merely detrimental to our welfare, as in the past, but positively ruinous. Germany's aims and methods are clear. Our policy in regard thereto should be equally definite and unmistakable.

It may be recalled, briefly, that in the last 30 years before the war the tonnage of Germany's ocean steam shipping was increased from 500,000 tons, mostly built in Britain, to 5,500,000 tons, almost entirely built in Germany. That great development was not due altogether, or even mainly, to the economical building resources of the country. As already mentioned, it was to a very large extent the outcome of subsidization. In the early 'eighties the German Government began to give practical assistance to shipping and shipbuilding. Special marine engineering schools and colleges were established. Engineers and workmen were paid secretly to go to England and other countries to learn. Foreign workmen were imported. German bankers were induced to give special encouragement to shipbuilders. In 1884 an act was passed for the payment of subventions to German-built vessels carrying German goods. In the 'nineties the German trade syndicates began to pay generous export bounties on manufactures, and these have also proved a great aid to the shipping industry. Our shipping has been left unaided to meet the subsidized competition of Germany.

In considering this question of German competition in shipping our supreme interest must be kept clearly in view. A mercantile fleet is as essential as a defensive war fleet to our sea supremacy. It is not merely important that we should retain first place in the international carrying trade—it is imperative that we should keep our long lead of all competitors, especially the Germans. And for this reason we are more of a manufacturing and less of an agricultural nation, relatively to population, than any other country. Germany employs 40 per cent of her workers in food production, against our 10 per cent. To balance our huge imports of food and raw material we must export correspondingly large quantities of manufactures. We are bound, therefore, to have an abnormal shipping trade. As our imports always exceed our exports, it is essential that we should build and own the vessels that carry these imports and exports, in order that the earnings of this shipping may help to maintain our trade balance. Again, as our country is small, relatively to population, and far

from being self-contained or self-supporting, it follows that we are very much in need of earnings from outside. And, yet again, we have a vast and widely-scattered Colonial Empire. For these reasons we must remain by far the greatest of shipping and shipbuilding nations or drift to ruin. Because we own nearly as much shipping as all other countries put together we must not imagine that our supremacy in this line is unchallengeable, or can be retained without effort. Only 30 years ago we made as much iron and steel as all other countries put together; but in the year immediately preceding the war Germany alone produced twice as much as we did. We must beware of Germany beating us in shipping by the same policy as she beat us in iron and steel—namely, subsidization plus protection and our negligence in guarding our own interests.—*Engineering*, 27/7.

GERMANY'S BOY-POWER.—We have heard for some months past that among the German prisoners whom we are capturing on the Western Front there is a large proportion of young boys, and from letters which have been taken on some dead Germans or found in their subterranean dwellings there seems no doubt that the 1919 class has already been called up, and that the 1920 class of boys will be in the ranks about Christmas time. The result of this seems to be that youngsters who have only just turned 17 have already been called up, and that many more of this age will have joined the army before the full severity of the winter sets in. The German boy is not, it must be remembered, wholly untrained when he joins; under normal conditions he has already undergone a by no means perfunctory training, and in time of war, and when Germany's need of soldiers is daily becoming more insistent, it may reasonably be expected that these lads will not remain overlong at their depots or training centers, but will be pushed on to take the places of the men at the front. We may admit that among all nations there are a certain proportion of boys between 17 and 18 who, in outward appearance, have the physique and stamina of men many years older, while it has usually been conceded that a recruit may be accepted at a younger age for service in Europe than for soldiering in the tropics. It is possible, however, that this war may cause us to reconsider this last view, and it is certainly the case that Germany, who has hitherto avoided calling up her recruits even in peace time until they were considerably older than those of the armies of her neighbors, would not now be mustering her boys of 17 and 18 unless her man-power was being very seriously depleted. But if these boys are to serve next winter at the front under similar, or worse, conditions than those to which her manhood has hitherto been exposed, we may soon be able to speak with equal confidence of Germany's dwindling boy-power.—*The Army and Navy Gazette*, 21/7.

GERMAN AIRCRAFT CONSTRUCTION.—Reliable reports from Romanshorn say that airplanes of the latest models, manufactured at the Zeppelin factory at Friedrichshafen, are to be seen daily flying over Lake Constance.

The reports add that the cessation of the manufacture of Zeppelins was due to the fact that German Headquarters became convinced that Zeppelins were of little war value, and that supremacy in the air in the future belonged to airplanes. The Germans are also said to fear an extensive American aerial program, and that therefore counteraerial preparations have been started by them. It is said that the workmen in all the Zeppelin factories in Germany have been doubled in number, and that the airships on hand have been removed to unused sheds.—*N. Y. Times*, 21/7.

GREAT BRITAIN

THE VANGUARD DISASTER.—Of its kind, the destruction of H. M. S. *Vanguard*, apparently by an internal explosion, is the greatest naval disaster we have had to deplore since the commencement of the struggle. Many ships have been lost in action, notably at Jutland, where in the space of

a few hours three great battle-cruisers and three other large armored vessels went to the bottom under a rain of German shell. But losses incurred in actual fighting, heavy though they must always be in the intensive fighting of to-day, seem less tragic than those we suffer through causes other than direct enemy agency. Unfortunately, the *Vanguard* is not the first warship we have lost in this way. The battleship *Bulwark* and the armored cruiser *Natal* were destroyed with the same appalling swiftness as they lay quietly at anchor, as was also the auxiliary vessel *Princess Irene*. The *Vanguard* was a much more valuable ship than any of these. It is true she was not a super-dreadnought, and that although only eight years had elapsed since her launch, she had already been left far behind by the mastodons which constitute the spear-head of the grand fleet. But the class of which she was a unit is still reckoned among the first rank of the dreadnought fleet, and her disappearance has, undeniably, left a gap in our main battle line. The lost ship belonged to the navy estimates for 1907-08. Built by Vickers Limited, she was launched at Barrow in 1909 and completed the following year. She was one of three vessels known as the *St. Vincent* class, the characteristics of which followed in the main those of the dreadnought. According to Brassey's *Annual*, the displacement was 19,250 tons, and the turbine machinery of 24,500 shaft horsepower gave a speed on trial of 22.1 knots. The armament consisted of ten 12-inch guns of a very powerful type, with an auxiliary battery of twenty 4-inch quick-firers and three torpedo tubes. The total estimated cost of the ship, including guns, was £1,607,781, and her normal complement numbered 724. These three ships were, as a matter of fact, considered slightly inferior to the dreadnought and the *Bellerophon* class. Their heavy guns were more powerful, but the ships themselves were of lighter construction and carried thinner armor than their four predecessors of the all-big-gun type. Tested by the usual formula for determining the tactical value of fighting ships, they were given a figure of merit rather below that of the German *Helgoland* class.

In view of the circumstances in which the *Vanguard* met her fate, we fear that no definite conclusions will follow the searching inquiry which is to be held. Most, if not all, of the officers who were intimately concerned with the ordnance equipment of the ship have lost their lives, so that theory and surmise will have to be dealt with in default of first-hand evidence. As is usual in disasters of this kind, one hears a great deal of talk about treachery. The responsible authorities may be in possession of facts which are not available to the public, and the secrecy that is essential in wartime renders it idle to indulge in speculation where no proved facts exist. When the *Bulwark* was blown up in the early stage of the war, the possibility of sabotage was accepted by a good many people, but, subsequently, there was an official announcement of the finding of the court of inquiry which showed the disaster to have been due to a pure accident. In the case of the *Natal*, no second announcement was ever made, a fact which was held in some quarters to confirm the popular theory of a German plot. On the whole, however, we are not inclined to attach much credence to the supposition that hostile emissaries are responsible for the loss of these ships. Cunning and utterly unscrupulous as we know our enemies to be, they would find it a matter of extreme difficulty to accomplish by underhand methods the destruction of a British warship, especially if it happened to be a member of the grand fleet. The navy is thorough in all that it does, and in nothing is it more thorough than in the precautions it takes against espionage. In theory it may be simple enough to think out divers means of perpetrating acts of sabotage, but in practice any such attempt would encounter formidable difficulties. Therefore, while the possibility of treachery cannot be ruled entirely out, we are disposed to share the more prosaic opinion that the loss of the *Vanguard* was due to an accident. Few who have considered the matter at all can have failed to marvel at the rarity of these naval disasters. Every warship, great and small, is a

potential volcano. Vessels of the battleship type carry deep down in their hulls hundreds of tons of the most violent explosives, and the slightest oversight, not to say negligence, in the handling, housing, or care of this deadly cargo may be fraught with the most terrible consequences.

Before the war, our navy was singularly free from such misfortunes, an immunity which was no doubt largely the result of the painstaking care exercised in the manufacture and storage of ammunition. But what is customary in peace may not always prove practicable in wartime. Nevertheless, considering the extraordinary circumstances, the quality of our munitions has been astonishingly high, and it is steadily rising, as we have learnt from recent statements by members of the ministry of munitions. The chemists, the engineers, and the factory hands are fully alive to the supreme importance of putting in the very finest work in their respective spheres while they are engaged in supplying our gallant sailors and soldiers with ammunition. And, in fact, officers of both services have repeatedly testified to the uniformly good standard of the explosives they receive from the home factories. The percentage of defective material has become almost infinitesimal. In land operations, an accident due to a defective cartridge or shell is rarely very serious in its consequences. But at sea the conditions are wholly different. The decomposition of a single 4-inch cartridge may annihilate the mightiest battleship.

The fact that disasters similar to that of the *Vanguard* have occurred in many navies during the war supports the theory of accident as opposed to that of deliberate agency. Two Italian battleships, the *Leonardo de Vinci* and the *Benedetto Brin*, were destroyed while in harbor; the Russian dreadnought *Imperatriza Maria* and the Japanese cruiser *Tsukuba* shared the same fate. No doubt, similar calamities have befallen the enemy fleets. They are part of the inevitable toll of war. Every fighting ship in every belligerent fleet is kept perpetually in a condition of instant readiness for action. Visits to the dockyard for repair and overhaul are only made when they become absolutely necessary. The ships are always under steam, and the problem of maintaining an equable temperature and proper ventilation naturally becomes far more complex than in peace. When not on active service, a warship does not generally have her magazines full. In wartime she carries her maximum supply of ammunition. These and many other equally pertinent facts deserve to be borne in mind, since they go far to explain why—happily at very long intervals—we have to mourn the loss of a fine ship and her gallant company through causes in which the enemy has no visible part. So far as the material aspect is concerned, the loss of the *Vanguard* is not irremediable. She represented a type in which we are exceptionally strong, and her disappearance does not mean any serious diminution in our margin of superiority over the armored strength of the German fleet. The grievous feature of the disaster is the loss of nearly 850 officers and men, the fine flower of their race. This terrible death-roll is the best proof that everyone was at his post, and died as nobly as if he had fallen in action against the foe. We may rest assured that everything that human skill and care can do will be done to avert a repetition of this sad occurrence, which has served as a reminder of the ever-present risks which threaten our fighting seamen, whether at anchor or facing the enemy's guns.—*The Engineer*, 20/7.

HOSPITAL SHIP FOR THE TIGRIS.—A specially designed hospital ship has been built by Messrs. Livingstone & Cooper, of Hessle, Hull, for service on the Tigris, to augment the fleet of some 30 vessels now engaged in the medical service in connection with the British forces operating in Mesopotamia.

The ship just completed is slightly smaller than the majority of vessels constituting the fleet, but is the latest idea in design and equipment for the evacuation of sick and wounded.

Designed with a draft of only 3 feet 6 inches, the vessel will be able to navigate the Tigris from the British main base at Bussorah as far as, and possibly above, the Hamrin Hills, at a maximum speed of 10 knots. The vessel is a complete floating hospital, with beds for 180 cot cases and accommodation for minor casualties, a fly-proof operating theater with electric sterilizing apparatus, lifts to enable serious cases to be moved from one deck to another with the minimum amount of discomfort, wards for mental cases, isolation rooms, etc.

The extreme climatic conditions of Mesopotamia have been kept well in mind by the designers. A system of ventilation has been installed throughout the vessel whereby it can be kept comparatively cool in the maximum summer temperature and warm in the autumn and winter, for in the latter season the conditions are somewhat severe in the upper reaches of the Tigris. For the summer, rotating electric fans have been fitted at an average of one to every four beds, while currents of cool air are pumped through apertures in the various decks. A special type of bed has been installed by which a patient in the most critical condition can be moved with the utmost ease from bed to stretcher or vice versa. All cabins are fitted with fly-proof windows and doors. The ship is provided with a fully equipped dispensary, a large store of dressings, etc., and dining saloons and kitchens. There is a refrigerating chamber by means of which milk, fresh meat, vegetables, etc., can be kept available, and an ice-making plant will provide the maximum amount of ice for each of the 180 cot patients. Distilled water is produced from special engines, and a system of filtration enables a germ-proof drinking supply to be always at hand. Everything possible seems to have been done in this particular craft to meet the particular demands arising from the vagaries of Mesopotamia.

The ship is oil-driven, lighted throughout by electricity, and provided with what is believed to be an innovation for this particular style of craft —four rudders—which enables it to turn like a taxicab.—*Shipping Illustrated*, 21/7.

THREE HUNDRED BRITISH MERCHANT VESSELS ARMED.—Three hundred British merchant vessels already have been armed and a large number are being armed each week, said T. J. MacNamara, Financial Secretary to the Admiralty, in reply to a question in the House of Commons July 27.

He added that the government was making great efforts to get a maximum number of merchantmen armed as soon as possible.—*N. Y. Times*, 28/7.

NAVAL CONSTRUCTION.—A cruiser built at the Kawasaki dockyard for the British Government was given a trial on June 26 and developed 16½ knots an hour. This is the third of a series of vessels built by the same corporation for Britain. The vessel is named *Soldier*, an odd title for a fighting ship. The officers and engineers have been in Kobe for some time awaiting the cruiser's completion. Vessels are under construction for the British Government at Kobe, Yokohama, and Hongkong.—*The Nautical Gazette*, 9/8.

REORGANIZATION OF THE ADMIRALTY.—*The New York Herald* of August 8 published the following *Associated Press* despatch:

"Official announcement is made at the Admiralty that Admiral Sir Cecil Burney, Second Sea Lord, has been replaced by Vice Admiral Sir Rosslyn Wemyss. Alan Garrett Anderson, hitherto Vice Chairman of the Wheat Commission, succeeds Sir Eric Campbell Geddes, the new First Lord of the Admiralty, as Controller of Naval Construction.

"Mr. Anderson, the new controller of the navy, who will be responsible for the Admiralty's shipbuilding requirements, has a close knowledge of both shipping and railways. He was long associated with a company of shipping brokers and is a director of the Midland Railway.

"The changes in the British Admiralty are attracting much attention, and are interpreted as the first step in a reorganization which it is supposed Sir Eric Campbell Geddes, First Lord of the Admiralty, was appointed to carry out.

"In quarters where the existing Admiralty methods are regarded as unsatisfactory the present step is denounced as a 'procrastinatory half measure,' and it is declared the change ought to have been so complete as to 'give the country a resolute and energetic Admiralty, permeated by an offensive spirit.'

"There is no implication of incapacity against Admiral Sir Cecil Burney, whose services as Admiral Jellicoe's second in command of the grand fleet are recognized, and an official announcement states that he will be employed on special duty. It is assumed that as his record was made in active command he may welcome the change.

"An official statement contains the announcement that an opportunity is to be taken of the appointment of Vice Admiral Sir Rosslyn Wemyss to rearrange the duties of the Second Sea Lord of the Admiralty, who will be relieved of detailed administrative work connected with the personnel of the fleet. This is interpreted as meaning that the Second Sea Lord will not be trammelled by details which subordinates can handle, but will be associated more closely than was his predecessor with the preparation of war details.

"Another change in the Admiralty is the removal of Sir William Graham Greene from the permanent secretaryship at the Admiralty to a secretaryship in the Ministry of Munitions under Winston Spencer Churchill. Sir William's departure from the Admiralty is regarded as of considerable importance, as the post of permanent secretary, which he has held since 1911, always has been largely responsible for the continuity of Admiralty tradition and policy. It is this continuity which is regarded by many as a most dangerous factor, in that it hinders initiative and adaptability to current needs."

Mr. Arthur Pollen discusses the changes.—Mr. Arthur Pollen writing in the *Evening Star* (Washington) August 9 said:

"When Great Britain's Welsh premier invited the Irish chief of the Admiralty to go into honorable retirement as a member of the war cabinet he appointed a young ex-railway manager, Sir Eric Geddes, to take his place, and did so for the extraordinary reason that this young man had shown himself to be one of the very ablest men that the country possessed. In less than three weeks, which is mighty quick going in the old country, the new first lord has got to work. During this interval he has apparently done all his old work, which was to supervise the entire civilian activities of the department, as well as acting as head and director of the whole. The three weeks have sufficed to show him the necessity for three preliminary changes.

"First of all he has relieved himself of all purely material cares. Mr. Adam Anderson, another railway man, who, like Geddes himself, has added greatly to his reputation during the war, succeeds him as controller. When Geddes took over this job in the beginning of May his first task was so to reorganize the machine as to make the efficient direction of the Admiralty purchasing and manufacture a feasible task. It meant sweeping away the barbed red tape entanglements which generation after generation of railway officials and of good naval officers converted into poor civilians had erected in defence of all the commanding points that departmental stupidity must fortify in self-defence.

"Geddes did all this with surprising speed and complete success. The amazing part of it all was that there was neither opposition nor resentment when he cleared the ground. It really looked as if the different branches and bureaus were positively relieved of being robbed of their power to obstruct and at being compelled to work smoothly, swiftly and efficiently,

just as if they were units in an organism most vitally concerned in winning the war. All this took about six weeks, and then Geddes, having smoothed the path for a successor, was made first lord. Mr. Adam Anderson, therefore, now steps into the control of a machine that can be controlled, which is a great thing. And there is little doubt that Mr. Anderson will control it extremely well.

"It is very significant that Sir Graham Greene for many years secretary of the board of Admiralty, has withdrawn to take a job in the munitions department under his former chief, Mr. Winston Churchill. It is highly probable that Sir Eric Geddes found the chief permanent official just a little too permanent in some of his inherited ways to suit his taste. It will be interesting to see who is appointed to succeed him.

"The real big stroke is the retirement of Admiral Sir Cecil Burney and his replacement by Rear Admiral Rosslyn Wemyss. I have not the British Navy list by me, but at a rough guess I should say that there are probably forty officers senior to Admiral Wemyss, who have been passed over to permit this officer to take this position. Wemyss is well under fifty and has long been regarded by the forward school as a 'white hope.' He was second in command to Sir John Derrobeck during the Gallipoli campaign, where his promptness, energy and fighting spirit showed him not only a real fighting leader, but a man possessed of that cool, quick judgment which is of the essence of the matter in war.

"The cables say the new second sea lord is to be relieved of the departmental duties that used to go with this post. The principal of these was the appointment of all officers of captain's rank and below it to their different commands, a very laborious task.

"The rearrangement of two months ago brought about an amalgamation between the war staff and the board of Admiralty. Admiral Oliver, at that time head of the staff, became a member of the board and the first sea lord, Sir John Jellicoe, became chief of the staff. It was intended by this stroke to identify the first sea lord with his principal war advisers and so to relieve him of his old crushing responsibilities of being solely responsible for the professional advice given to the government. But the first sea lord was still left as the chief administrative head of the whole active navy. I expect what will happen is that the first sea lord's functions will now be cut in half; that he will remain the chief professional administrator of the active navy, and that the second sea lord will become chief of the war staff. In other words, the strategy of the British Navy will be defined and directed by a board within the board, or, perhaps better, a staff within the board, of which Rosslyn Wemyss will be chief. It will represent the triumph of the younger school.

"When the great changes took place in May those of us who had fought so hard for them and for so long approved everything that had been done, but complained that the thing had stopped too soon. The actual direction of the war still remained in the hands of the old gang. But we also saw that the thing could not remain stopped where it was. It had to be pushed on to its logical conclusion, yet every one felt that there was a very real difficulty in deposing an officer held in such high esteem as was Sir John Jellicoe. It looks as if Sir Eric Geddes has found an extremely ingenuous and perfectly effective way out of the difficulty. He keeps Admiral Jellicoe as first sea lord and gives the chief direction of the war to a younger man, full of the fighting instinct and in touch with the mentality of the offensive school.

"If the appointment of Admiral Wemyss means what I hope it means, then we may expect to see the vast potential power of the British Navy applied to winning the war in a fashion in which it has not yet been applied. It would be a tremendous stroke if some means could be found for associating the high strategic talent and the unrivaled professional knowledge possessed by the American Navy with those who are about to undertake the new orientation of British naval policy. What might not be hoped

from a union between the young, war-trained brain of the British Navy with the unprejudiced, resourceful brain of our American brothers in arms?"

BRITISH SHIPYARD RESTRICTIONS.—Since July 1, it is unlawful for any person being the owner of a ship, or employed as a ship's agent, shipbroker, or ship's husband, or as an inspector or surveyor of ships or their machinery, if he is not a natural-born British subject, at war with England, to enter any British shipbuilding yard without the permission in writing of the Admiralty or Army Council.—*Shipping Illustrated*, 28/7.

ADMIRALTY APPEAL TO WORKERS.—The Iron and Steel Trades Confederation has received the following message from the First Lord of the Admiralty and Sir J. Jellicoe, the First Sea Lord:

"The Board of Admiralty wish to impress on all engaged in building or repairing ships how serious are the times in which we live. A determined enemy has set himself to blockade our islands and to destroy the merchant ships which bring food to the people and supplies to the army, and is using methods which are contrary to the law of nations. Every day merchant ships are being sunk, and we need to use all our resources to prevent our being threatened with starvation. The enemy knows this, and has staked everything upon it. If he succeeds, victory will rest with him; but, if he fails, his defeat is certain.

"There are only two weapons that we can use, and both can only be forged in the shipyards of the country. One is the class of warship that enables the navy to hunt and destroy the enemy's submarines; the other is every new merchant ship that takes the place of a ship that has been sunk. These weapons must both be used together, and upon the men of the shipyards and engineering shops depends entirely the output of these weapons. How this output can be increased is a question that concerns every one of us, and no measure that helps to make better use of our labor and our machinery can be neglected. We, who are secure in our homes, owe it to the brave men who are dying hourly for us on sea, on land, and in the air, the sparing of no effort to give them the weapons with which to win the war for us.

"The Board of Admiralty are confident that, in the supreme crisis of our history, the men in the shipyards and the workshops will see to it that this appeal shall not fall on deaf ears."—*The Engineer*, 20/7.

STANDARDIZATION OF ENGINES.—Dr. Addison, until recently British Minister of Munitions, has made the statement that to make Britain secure against the submarine menace she must have a merchant shipbuilding program—which includes an engine-building program—on a scale three times greater than last year's.

Such an increase in output can only be achieved by devoted work on the part of labor and by standardization of design. Schemes for the building of a very considerable amount of standardized merchant shipping have already been given practical effect to by the British Government. A great step forward in standardizing the engines of cargo vessels has recently been made by the Northeast Coast Institution of Engineers and Shipbuilders, a step which should help materially in securing the desired trebled output.

Toward the end of last year a committee was appointed by the council of the institution to prepare a specification embodying the best practice of the leading makers on the northeast coast. This was done, and after being very fully considered the specification was finally approved.

An appeal was then made to the engine builders by the council to adopt the specification in the interests of progressive engineering.

Favorable replies were received, and the scheme is now an accomplished fact. In the industry generally the adoption of this specification marks an epoch. It means standardization in its best sense, viz., the selection of the best and continuous maintenance of the best. The great ship-owning firm of Furness, Withy & Co., Ltd., has at once adopted the new departure, a lead which will insure its immediate success.—*N. Y. Times*, 23/7.

LORD BERESFORD SAYS RATE OF SINKING IS SEVEN MILLION TONS A YEAR.—Charles H. Grasty in an article which appeared in the *N. Y. Times* July 21 said in part; "Lord Beresford gave me a statement July 20, ... as follows: 'The Allies are not the least bit aware of how crucial the position is. . . . . We are all dependent upon British, allied and neutral shipping, and the fact is that the average rate of loss from February . . . . has been at the rate of over 7,000,000 tons per year.'"

ADMIRAL BEATTY AS FIRST SEA LORD.—A London cable dated August 12 says:

"The possibility of Vice Admiral Sir David Beatty relinquishing command of the grand fleet, and taking Admiral Jellicoe's place at the Admiralty, is suggested by *The Sunday Times*. The strain on Admiral Jellicoe during the last three years has been great and continuous, and has well earned a respite.

"Admiral Beatty's advent at Whitehall would be regarded with unmixed satisfaction, says *The Sunday Times*, by a large body of naval opinion which favors strong offensive strategy.

"'Beatty,' it goes on, 'is said to be one of the most prominent of this group. He is, and will be for the next 10 years at least, the biggest asset of the navy. He has the real Nelson touch.'"—*N. Y. Times*, 13/8.

JAPAN

YOKOHAMA HARBOR IMPROVEMENTS.—It is stated, says *The London and China Telegraph*, that following the completion of the new pier in Yokohama, the Department of Finance will turn its attention to the dredging of the harbor. According to the official scheme, 494,000 tsubo will be dredged to a depth of 35 feet, 353,000 tsubo to 30 feet, and 200,000 tsubo to 24 feet. The work will extend over a period of 10 years. (1 tsubo = 3.95 sq. yards.) —*Engineering*, 20/7.

RUSSIA

NEW COMMANDER-IN-CHIEF OF BALTIC FLEET.—Rear Admiral Razvozoff has been appointed commander-in-chief of all the Russian naval forces in the Baltic.

The newspapers July 20 announced that Rear Admiral Verdervski, commander of the Baltic fleet, had been arrested for communicating a secret government telegram to sailors' committees.—*N. Y. Times*, 26/7.

UNITED STATES

DESTROYER "STOCKTON" LAUNCHED.—The U. S. S. *Stockton*, of 1121 tons displacement, was launched from Cramp's shipyard, Philadelphia, July 17.—*Shipping Illustrated*, 21/7.

THE NEW BATTLESHIPS.—The naval officials are completing the designs for the next type of battleships to be constructed. These will be of 40,000 tons displacement, with a horsepower of 60,000. The armament will consist of 16-inch guns, and the engines will produce a speed of 23 knots.

Special provision will be made for protection against submarine attack. The decision of the naval authorities in favor of the enlarged vessel is founded on its combined characteristic of increased hitting power and increased resistance against any form of attack. There will be not only protection by means of added armor, but by virtue of internal construction. There has been, of course, the usual and natural difference of expert opinion as to the relative effectiveness of a battery composed of 14-inch guns and one consisting of the larger caliber which has been adopted, the argument proceeding along familiar lines with opportunities for interminable discussion. It is one of those questions which are not likely to be finally settled short of an actual collision with the enemy at sea. There is about an equal range of claims to be made on both sides of the controversy over the caliber of armament, but the conclusion of the Navy Department in favor of the 16-inch gun is regarded as wisely coming at last to the powerful battery afloat that is essential for success in battle.—*Army and Navy Register, 21/7.*

ADDITIONAL DESTROYERS.—An order from the United States Government for five additional torpedo-boat destroyers has been received by the Newport News Shipbuilding and Drydock Company, according to Homer L. Ferguson, president and general manager. It is understood that the order for the five crafts is one of a number given last week totaling 50 destroyers. The work was distributed among different yards of the United States. The ships will be of the 1100-ton class, regulation dimensions, and will cost approximately $1,300,000 each. The six already under construction are to be delivered within 10 months and the additional five will be delivered some time next year.—*Shipping Illustrated, 4/8.*

NEW DESTROYER CONTRACTS.—New contracts have been let by the United States Navy for 1100-ton destroyers. Cramps get order for 15; Union Iron Works 6; Fore River Co. 16, and others are distributed among the Bath Iron Works, Newport News and New York Shipbuilding companies. Plans are also being made to construct 140 of the 750-ton destroyers.—*Shipping Illustrated, 11/8.*

FUEL SHIPS.—The Secretary of the Navy announces that in order to provide necessary transportation, to meet urgent fuel oil needs of the navy, he had found it necessary to requisition several commercial tankers. Seven vessels have been ordered to report at the earliest practicable date to various navy yards on the Atlantic and Pacific coasts, where they will be put in readiness for oil transport. In obtaining the tonnage necessary for this service every effort has been made to distribute the requirements among the various tank owners in such a way as to cause the least possible embarrassment in supplying the commercial needs of the United States. Special consideration has also been given to those tankers engaged in the transportation of supplies to the Allies.—*Shipping Illustrated, 28/7.*

HOSPITAL SHIP.—A new naval hospital ship has been obtained on the urgent recommendation of Surgeon General Braisted, and an additional vessel of that type will probably be acquired later. The vessel which has been obtained for this purpose is the steamship *Havana*, of the Ward line, and is regarded as adaptable in all respects. It will, of course, have to be converted, and the work in that direction has already been begun. While the accommodations to be available depend to some extent upon the alterations, it will be possible, it is believed, to provide some 300 beds. This hospital ship and another one to be obtained will undoubtedly be assigned for duty with the Atlantic fleet.—*Army and Navy Register, 4/8.*

SUBMARINE CHASERS.—Secretary Daniels on August 6 confirmed the statement that the Navy Department had decided, following the recom-

mendations of the Navy General Board, to place no more contracts for submarine chasers, but to build every destroyer possible. He added that it was not exactly correct to say, as had been reported, that submarine chasers had been abandoned entirely, but that all which possibly could be constructed in a certain time had been built, and both the General Board and the Bureau of Construction and Repair had not recommended the building of any more.

Several hundred 110-foot chasers were ordered originally, and these are now being delivered. These boats have been found serviceable for rivers and harbors, but are faulty in sea service, one destroyer, it has been estimated, being worth 50 chasers in operations against submarines.

The latest destroyers being constructed are 315 feet long, and, while figures are withheld, the number under construction and to be built is formidable. There is the closest co-operation between the Shipping Board and the Navy Department, so that the navy may obtain the maximum number of destroyers in the shortest possible time. Admiral Capps and Secretary Daniels, sitting with their expert aids, hold almost daily conferences.

Intimations came from diplomatic quarters August 6 that naval experts of the Allies probably would undertake to demonstrate to the American Navy Department the wisdom of continuing on an extensive scale the building of submarine chasers. Advocates of the chasers assert that in operations near shore fleet little craft such as the 110-footers that American boat builders now are turning out in large numbers have been most successful in the war zone. The Navy Department's policy of limiting the output of chasers here is not looked upon with favor by the allied sea strategists.—*N. Y. Times*, 7/8.

REORGANIZATION OF ATLANTIC FLEET.—Reorganization of the Atlantic fleet has been ordered by Secretary Daniels to meet new problems resulting from expansion of the force to almost twice its normal size for war service.

Details of the steps are withheld for military reasons, but the Secretary announced July 18 that the reorganization plan involved the addition of another vice admiral to the fleet, and that Rear Admiral Albert W. Grant, now commanding the submarine force, had been named for the place.

Admiral Mayo will remain in general command, with the immediate authority under him divided between Vice Admiral Coffman, at present second in command, and Vice Admiral Grant. The former is to have direct command of a division containing most of the superdreadnoughts and designated as "Force No. 2," while Vice Admiral Grant will command the remainder of the fleet under the designation of "Force No. 1."

It is understood that the reorganization will not affect the division of the fleet now in European waters under Vice Admiral Sims. At the Navy Department it was indicated that possible operations overseas were not contemplated by the changes, and that there was little probability that either Vice Admiral Coffman or Vice Admiral Grant would be sent abroad in the near future.

Vice Admiral Grant's appointment leaves no vacancies in that rank, and if additional vice admirals are needed a further authorization will have to be sought of Congress. Authority for the appointment of three was granted with the understanding that one would be appointed for the Atlantic fleet, another with the Asiatic fleet, and the third with the Pacific fleet, but so much more importance has been forced upon the Atlantic forces that it was decided to station all three vice admirals there. Vice Admiral Grant will be succeeded as commander of the submarine force by Captain S. S. Robison, now commanding the battleship *South Carolina*.

"This carries into effect a plan worked out by Admiral Benson and Admiral Mayo, which has been under consideration for several months," said Secretary Daniels, regarding the reorganization plan. "There are now twice as many battleships in commission as we ever had before; in fact, every battleship we have is now in full commission.

"The whole purpose of the new organization is to keep our battleship fleet in as perfect condition as possible, to put it in the highest state of efficiency and readiness for action."—*N. Y. Times*, 19/7.

WASHINGTON NAVY YARD.—Secretary Daniels announced July 22 that he was asking Congress for an appropriation of $7,500,000 to increase the capacity of the Washington Navy Yard, where all the big guns for the American Navy are finished and assembled. The new shops to be built are to be used for the manufacture of guns, mounts, torpedoes, mines, telescopes, sights, optical instruments, and miscellaneous ordnance supplies. It is the plan to spend $5,000,000 on new buildings, craneways, storage, and handling facilities, and $2,500,000 for machinery.

"Contracts for guns, mounts, and other ordnance supplies," said the Secretary in asking for the appropriation, "are becoming increasingly difficult to place. The proposed work includes the construction of a large six-story machine shop for mines, mounts, and torpedoes; a five-story pattern and wood-working shop, an extension to the power plant, a new brass foundry, an extension of the steel forging plant, an optical shop, range finder towers, administration building, quarters for enlisted personnel under instruction, and the extension of the yard service system to supply adequately these new structures.

"With the accomplishment of the extensions contemplated ample manufacturing facilities will be provided for the manufacture of from 300 to 900 torpedoes per annum, at least 3000 mines per month, a large increase in the manufacture of guns, mounts, and other ordnance accessories, and the manufacture and repair of the larger part of the optical work for the entire naval establishment."—*N. Y. Times*, 23/7.

CAPE MAY BASE.—According to *The New York Herald* of August 7, the new base at Cape May, now under construction, will consist of four boat houses, a pier, a dirigible hangar, a seaplane hangar, machine shops and quarters for men, the base hospital, an administration building, nurses' quarters, hospital corps barracks, civilian barracks and other structures.

NAVY YARDS REPAIRING SEIZED GERMAN SHIPS.—The Navy Department has taken some of the seized German ships into navy yards for repairs, owing to labor troubles in private yards which have interfered with the Department's program. Unless the difficulties in private yards are soon composed the Department will take away more of the German vessels. Practically all the trouble centers in yards around New York.—*Shipping Illustrated*, 11/8.

EX-GERMAN LINER "VATERLAND."—Because no drydock large enough has been found available to accommodate the ex-German liner *Vaterland* the United States authorities are making use of divers for the purpose of scraping and cleaning her hull. This work is progressing rapidly. The total cost of putting the large vessel into commission will amount to about $875,000, it was learned.—*Shipping Illustrated*, 4/8.

NAVY TAKES OVER DOCKS IN BROOKLYN.—The dock commissioner announces that 100,000 square feet of city property, from 33d street to 35th street, on the Brooklyn waterfront, has been turned over to the Navy Department. It is understood that most of this ground is to be occupied by two-story warehouses for storing government supplies. The land taken adjoins the long pier at the foot of 35th street, seized from the Luckenbach Steamship Co. in February, and turned over to the navy. The pier has long been crammed to its capacity with stores. Part of the land now serves as a camp for the detachment of marines on guard duty at the pier. The dock commissioner has also turned over to the government for use of the Engineer Corps the two piers at 55th and 56th streets, North River. The

sites will be used in conjunction with the army depot in Hoboken. The pier at the foot of 56th street is 1000 feet long and 150 feet wide and has 300,000 square feet of deck surface.—*Shipping Illustrated*, 28/7.

WATER FRONT AT BOSTON NAVY YARD.—The Massachusetts State Commission on Waterways and Public Lands has notified the Secretary of the Navy that it would be willing to permit the Navy Department to extend the navy yard piers temporarily, as a war measure. The commission is conducting an investigation to determine whether a permanent extension would adversely affect navigation in the harbor. Lengthening of the piers would make possible the construction of capital ships of the navy at this yard. Secretary Daniels in a recent letter to Congressman Tinkam, charged that the commission was hampering the Department's efforts to obtain longer piers.—*Shipping Illustrated*, 4/8.

ADDITIONAL SHIPS FOR NAVY FROM SHIPPING BOARD.—An executive order published in the *Official Bulletin*, August 4, directs that the *Andromeda* and the *Staatssekretar Solf* be transferred to the Navy Department.

THE "GEIER."—It is stated that the U. S. Coast Guard cutter *McCullough*, sunk in collision in the Pacific early this summer, will be replaced by the former German gunboat *Geier*, of 1400 tons displacement.—*The Marine Journal*, 11/8.

ADDITIONAL NAVAL ESTIMATES.—Secretary Daniels on July 21 submitted to the House estimates aggregating $137,366,177 for war needs of the navy, including ammunition, ordnance supplies, improvements of yards and docks, clothing, and enlargement of the navy yard and gun factory here.

Secretary Daniels explained that these and other estimates recently submitted are "imperatively necessary for the public service," but for obvious reasons cannot be explained in letters of transmittal.

The largest estimate is $105,566,177 for "the naval establishment." This included $12,466,000 for ordnance and ordnance stores; $25,000,000 for ammunition; $22,000,000 for batteries and outfits for vessels; $30,000,000 for reserve and miscellaneous ordnance supplies, and $2,650,000 for clothing for Marine Corps.

A separate appropriation of $23,400,000 for yards and docks is asked. Another of $10,000 is sought for purchase of a 27-acre tract of land adjacent to the submarine base site at New London, Conn., needed for storage of submarine nets and mines.

In anticipation of the return of sick and wounded soldiers bringing contagious and infectious diseases, the Federal Public Health Service plans to construct additional quarantine barracks on several Atlantic seaboard sites. A request for $559,270 for this purpose is included in the $1,000,000 estimates submitted to the House of Public Health Service requirements. These include also $300,000 for a campaign of co-operation with state and municipal health authorities to combat diseases which it is feared may be brought from Europe by returning soldiers.—*Army and Navy Register*, 4/8.

UNITED STATES COMMANDEERS SHIPS.—Admiral Capps, general manager of the United States Emergency Fleet Corporation, has sent the following telegram and letter to the owners of American ship yards:

By virtue of an act approved June 15, 1917, and authority delegated to Emergency Fleet Corporation by Executive Order of July 11, 1917, all power-driven cargo-carrying and passenger vessels above 2500 tons deadweight capacity under construction in your yards and materials, machinery, equipment and outfit thereto pertaining are hereby requisitioned by the United States and will be completed with all practicable dispatch. Letter follows. W. L. Capps, General Manager.—*Official Bulletin*, 4/8.

FORM OF COMMANDEERING IN THE NAVY.—One of the most important of the new developments connected with the purchase of supplies for the

naval establishment is a recently adopted form of order "to furnish and deliver material by the navy." This is placed under one of two conditions which are described as follows:

(a) The price herein stated has been determined as reasonable and as just compensation for the material to be delivered; payment will be made accordingly. If the amount is not satisfactory, you will be paid 75 per centum of such amount, and further recourse may be had in the manner prescribed in the above-cited acts. Please indicate conditions under which you accept this order by filling in and signing certificate below, returning one signed copy of order. If you state the price fixed as reasonable is not satisfactory, 75 per cent only of the unit price will be paid. If payment in full is accepted it will be considered as constituting a formal release of all claims arising under this order.

(b) As it is impracticable to now determine a reasonable and just compensation for the material to be delivered, the fixing of the price will be subject to later determination. You are assured of a reasonable profit under this order; and as an advance payment, you will be paid the unit prices stated hereon, with the understanding that such advance payment will not be considered as having any bearing upon the price to be subsequently fixed. Any difference between the amount of such advance payment and the amount finally determined upon as being just and reasonable will be paid to you or refunded by you, as the case may be. The unit price stated herein will not prejudice any future price determination or be considered as a precedent in determining such increase or decreases as may be later decided upon as proper.

Under one paragraph the order is placed on a fixed and final price; under the other the price is left for determination. Of equal importance is the condition that prescribes that "compliance with this order is obligatory and no commercial orders shall be allowed by you to interfere with the delivery herein provided for." This is a form of commandeering and avoids the risk of commercial damage suits and provides a relief from the liability that, without such protection, would operate to the detriment to the government and with disaster to the contractor.—*Army and Navy Register*, 4/8.

EMBARGO ON ALL SHIP STEEL.—The following statement by the Committee on Public Information was published in the *New York Times* August 3:

"The President to-day (August 2) gave additional instructions to the Secretary of Commerce for the guidance of the Division of Export Licenses in future shipments of steel and iron products and explosives. The new rules governing steel and iron shipments, which supersede all previous regulations, are as follows:

"First.—That all shipments to those nations associated with the United States in the war are, until further instructions, to be licensed freely, without reservation, and without restriction, except iron and steel plates, pig iron, iron and steel scrap, and steel billets, for which licenses shall be granted only in case said articles are destined for actual war purposes or will directly contribute thereto.

"Second.—Licenses which may be properly issued will be granted for shipments of all iron and steel plates and structural shapes, and other articles properly included under these general headings under the following conditions only:

"1. The application for such licenses must be received by the Department of Commerce, Division of Export Licenses, Washington, D. C., on or before August 10, 1917.

"2. Such articles shall be completely made up and manufactured on or before August 10, 1917.

"3. Such license shall be valid and shall indicate that it is valid only in case such shipments are covered by railroad or ocean bill of lading dated on or before August 15, 1917.

"With respect to the general term 'explosives' used in the proclamation of the President on July 9, 1917, the following chemicals are included in its meaning: Ether, alcohol, sulphur, sulphuric acid and its salts, acetone, nitric acid and its salts, derivatives of benzol, phenol (carbolic acid) and its derivatives of toluol, mercury and its salts, ammonia and its salts, glycerine, potash and its salts, all cyanides."

ORDNANCE AND GUNNERY

NOTES ON GUN EROSION.—The subject of gun erosion is one of very special interest at the present time. The question was recently dealt with by Mr. H. Fay, in a paper read before the American Institute of Mining Engineers. In this paper a detailed study of a worn 12-inch gun tube has been made with a view to throwing light on the behavior of the surface in becoming hard and brittle; resulting in cracking and erosion during use. Examination of rings cut at various points along the length of the tube showed that the greatest amount of wear, and the maximum thickness of hard surface layer, were found in the ring cut close to the powder chamber; a ring cut 12 inches nearer to the muzzle showed the greatest number of and deepest cracks, after which, there was progressively less effect towards the muzzle. At the muzzle the sole effect was the production of heat cracks on the driving edge of the bands only. The hardening may be produced by three causes: (1) cementation; (2) rapid cooling of the heated surface layer by the great mass of material; (3) mechanical deformation. Microscopical examination indicated that all three actions take place during the passage of the projectile and gases.—*The Engineer*, 29/6.

NITROSTARCH AS AN EXPLOSIVE.—The name dynamite was first chosen by Nobel to designate the relatively safe explosive which he obtained by impregnating kieselguhr with nitroglycerin. The name has since become general for certain explosives, which may or may not contain nitroglycerin. Gelatine dynamites are solutions of guncotton (nitro-cellulose) in nitroglycerin; guncotton itself is scarcely suitable for mine blasting; attempts have been made to find a substitute for gelatine dynamites, and success has recently been obtained with starch, which chemically bears a strong resemblance to cellulose. According to S. S. Sadtler (*Metallurgical and Chemical Engineering*, April, 1917) starch forms nitro compounds—more correctly nitrate esters—like cellulose, and they are less bulky and less expensive than guncotton, and make a superior blasting agent. The nitrostarch is stable, has been stored for 10 months, does not freeze, and can only be exploded by the aid of a detonator. At the present time both starch and cellulose are scarce; in normal times starch is very much the cheaper material, and if the nitration of starch should really prove to be as simple as claimed, more will be heard of nitrostarch.—*Engineering*, 29/6.

GUN STEEL.—It is reported that Germany is lining her big guns with a uranium steel which stands up at a rate of fire destructive to all other known steel alloys. A necessary preliminary to the use of such a substance is a supply of ferro-uranium. This is ordinarily obtained from the uranium oxide which comes as a by-product in the extraction of radium from its ores. Accordingly it presents a problem for the electric furnace. This matter is being looked into by the Bureau of Mines, in connection with Cornell and other universities.—*Scientific American*, 4/8.

THE GERMAN CHEMICAL AND EXPLOSIVE INDUSTRY.—An understanding has been arrived at between the works of the big chemical industry, the so-called "aniline" concern, and the "explosives group," and indirectly also with the "powder group," which latter works in connection with the explosives group. The new arrangement may be looked upon as settled,

even if all the documents have not yet been actually signed. The aniline works, from the stoppage of their export trade and the dearth of raw materials, have been compelled to curtail their regular peace manufacture and instead go in for the production of materials used in the explosives industry and of actual explosives. It is this increased production of explosives, etc., which has enabled Germany to carry on the war as she has, and has even resulted in a surplus, and this, again, is due more especially to the vast increase in the atmospheric nitrogen industry. As long as the war, with its immense munition requirements, goes on, this increased production will not be attended by any drawbacks. The new arrangement is only intended to come into operation after the war. Its purpose is to secure and fix the production of the respective groups, which at present is very much alike, and to lay down mutual limitations of the manufacture. The individual groups will maintain their complete independence and entire freedom within the allotted domain, and will consequently also have free hands altogether as regards their price policy.—*Engineering*, 20/7.

BRITISH RESTRICT USE OF COAL TAR PRODUCTS.—The Minister of Munitions, in exercise of the powers conferred upon him by the Defence of the Realm Regulations and the Munitions of War Acts, 1915 and 1916, has ordered that all users or consumers of creosote oil, green oil, sharp oil, anthracine oil or other oils with a specific gravity of 1.000 or more, distilled from coal tar, and all oils with a specific gravity of 0.950 or more distilled from other tars, shall, within 14 days of the date (July 13) of his order, furnish to the Controller of Mineral Oil Production, M.P.S. 3, 8, Northumberland-avenue, London, W.C. 2, the following particulars: (1) The source or sources from which their present supply is obtained. (2) The quantities of such oils used or consumed by them from January 1, 1917, to June 30, 1917. (3) The quantities of such oils which it is anticipated will be used or consumed by them from July 1, 1917, to December 31, 1917. (4) Full details of the purposes for which such oils have been or are intended to be used or employed.—*Shipping Illustrated*, 20/7.

BRITISH INSPECTORS OF EXPLOSIVES REPORT FOR 1916.—The annual report for the year 1916 of his Majesty's Inspectors of Explosives is, all things considered, as satisfactory as could be expected under present conditions. It is true that the number of casualties which occurred during manufacture is very much higher than in any previous year since the Explosives Act came into force, and that there were 195 deaths as compared with 21 in the previous year. But attention must be paid first to the vast increase in the number of persons employed in the manufacture of explosives and in the quantity of explosives produced, and, secondly, to the relative inexperience of many of those handling the explosives during their manufacture and the high pressure at which the work is necessarily carried on. Of the 195 fatalities, 158 were caused by four accidents, the remainder, 37, arising from 359 accidents. If we look only at the four big accidents, then, we are encouraged in the popular belief as to the grave risks involved in working in an explosives factory. But if we study the others we see that in the vast majority of cases an accident in an explosives factory is, as regards its fatal consequences, hardly more serious as a general rule than a "boiler" explosion.

While the manufacture of explosives has thus entailed a very greatly increased toll of life—the same story we fear will be repeated in the report for the current year—the number of accidents and the cases of death and injury caused thereby during the use of explosives are normal. Thus there were 274 such accidents in 1916 as compared with 276 in 1915. The deaths numbered 45 and the cases of injury 274, as compared with 48 and 298 respectively in 1915. Having regard to the amount of unskilled labor now employed at mines and quarries it is somewhat surprising, the report remarks, that accidents are not more numerous.

The report contains reference to certain experiments which have been carried out during the year under the auspices of the explosives inspectors. By one of these investigations, it was established that water is by far the best extinguishing agent for dealing with fires such as are likely to be caused by bombs, and that dry powder extinguishers are "practically useless" for this purpose. In another investigation the qualities of a well-known brand of safety glass were established as affording great protection to operators when filling detonators. An experiment was also made to ascertain whether the explosion of a hand grenade when packed for transport would communicate explosion to the other grenades in the box. It was found that even when the 12 igniters were in the box with 12 grenades, the detonation of one grenade, although causing the detonation of all the igniters, did not communicate to the other grenades. Finally, some tests were made to determine whether the addition of 2 or 3 per cent of moisture to a fulminate composition would appreciably diminish its sensitiveness and render it safer for filling detonators than the dry composition. It was found that the addition of as much as 5 per cent of moisture to a mixture of fulminate of mercury and potassium chlorate gave no practical increase of safety. Such mixtures should, therefore, be treated with the same precautions as are usual when dealing with dry fulminate composition.—*The Engineer*, 29/6.

KENT ISLAND SELECTED FOR PROVING GROUND.—The Secretary of War on July 25 issued a statement corroborating the information published July 14, regarding the selection of Kent Island, Md., as the site for a new proving ground for ordnance to supplement that at Sandy Hook, N. J. Steps will be taken at once to secure an appropriation from Congress for the purpose of starting work on the project. The statement follows:

"The War Department finds that the Sandy Hook Proving Ground is inadequate to meet the present demands for the test and proof of ordnance and ordnance material, and that there is imperative need of the prompt acquisition and equipment of a proving ground to meet the present requirements, which are based upon the greatly increased range and power of mobile artillery, especially.

"In search for a suitable site a most exhaustive survey was made of all the country east of the Mississippi River, and the only site found to meet the irreducible requirements was Kent Island in the Chesapeake Bay, east of Annapolis, Md. This island possesses, to a marked degree, the requisites for a proving ground of the type imperatively needed, and every effort will be made to secure the needed funds from Congress for the acquisition and equipment of this island as a model army proving ground for the test of artillery cannon, ammunition and accessories."

An appropriation of $3,000,000 for the acquisition of the Kent Island site is carried in the deficiency estimates submitted for the War Department. The island is not mentioned specifically, but in view of Secretary Baker's statement it is safe to say that the funds sought for a "proving ground" will be spent for the Kent Island property.—*Army and Navy Journal*, 28/7.

NITRATE PLANT.—Secretary Baker announced July 16 that a plant for the production of nitrates from atmospheric nitrogen would be constructed immediately at a cost of about $4,000,000 and that water-power would not be used. Sites have not been selected.

Further discussion by localities desiring to be considered as possible sites is closed temporarily, the announcement says, while the site committee of cabinet officers is making engineering studies.

It has been assumed ever since the great nitrate project was proposed that a vast supply of water-power would be needed. Consequently sites with water-power have been supposed to be the only ones likely to get considera-

tion. Muscle Shoals, of the Tennessee River, was one of the places most strongly advocated in debates in Congress.

Congress appropriated $20,000,000 for the project. Apparently the entire expenditure contemplated by the War Department is one-fifth of that sum.

Secretary Baker's statement follows:

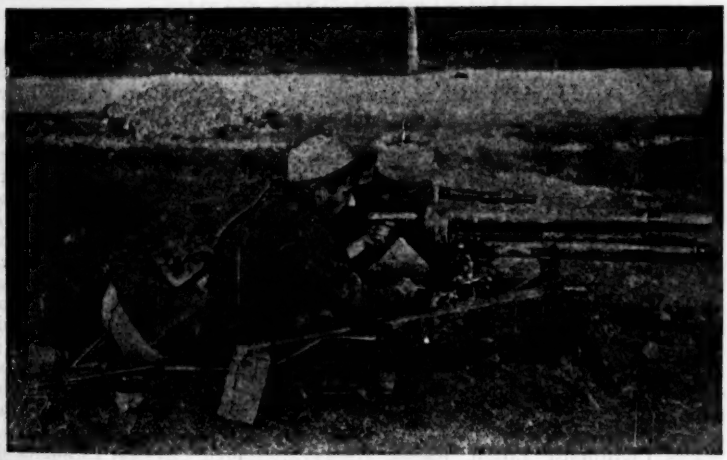
"By direction of the President, certain plants will be immediately constructed for the production of nitrate from atmospheric nitrogen. The plants to be constructed do not involve the use of water-power, but use a process which is a modification of processes previously known; and the total expenditure involved in these projects is about $4,000,000.

"Nothing further can be said at this time about the process or the location of the works which are to be constructed. Of the total amount appropriated by Congress, namely $20,000,000 substantially $16,000,000 remains undesignated as to its expenditure by the President.

"The committee, consisting of the Secretaries of War, Interior, and Agriculture, to which the President referred the question of the selection of a site or sites for the development of water-power, has made no report to the President on that subject, but is engaged in the making of further engineering studies; and the subject is temporarily closed to further discussion by localities and communities desiring to be considered as possible sites for the plants."

Informally officials explained that the announcement did not mean that the idea of building a water-power nitrate plant had been permanently abandoned, although it would not be pressed at present. Several years would be required to build the enormous plant required for the utilization of water-power, and for that reason it was determined that for urgent war purposes it would be necessary to adopt one of other processes of producing nitrates.—*N. Y. Times*, 17/7.

A QUICK-FIRING CANNON WHICH ADVANCES WITH THE SKIRMISHERS.—In order to combat the German machine guns the French of late have



FRENCH COLONIAL TROOPS OPERATING A 37-MILLIMETER FIELD PIECE WHICH IS DESIGNED TO DESTROY ENEMY MACHINE GUNS

introduced in their army a new quick-firing cannon of such construction that it can be readily carried forward by attacking infantry. Thus the skirmishers are able to put enemy machine guns out of action by well-directed shots from their 37 mm. cannon, which they can carry along with them.

The French "37" is a befitting companion to the famous "75," which has figured so prominently in the French campaigns to date. It will be noted in the accompanying illustration that the smaller weapon has every feature of its larger brother, including quick-acting breech mechanism, accurate sights and automatic recoil. Lying out on open ground the crew of two men can fire up to 35 high explosive shells per minute. The shells measure almost 1½ inch in diameter, and the gun has a range well above a mile for accurate shooting. This odd little field piece can be readily taken apart and carried by six or eight men, and is available for use in advanced positions as well as in the open. It is a most workmanlike piece of armament for use under the conditions prevailing on the Western Front.—*Scientific American*, 4/8.

HOW THE FRENCH NAVAL OBSERVERS MAKE TRIPLY SURE OF GETTING THE RANGE.—Not satisfied with the degree of accuracy of the usual single range finder employed on board warships, the French navy has developed a triplex range finder which permits to taking three simultaneous observations which are used as a check on each other. In this manner an average reading is obtained, and this reading allows for differences in the accuracy of the instruments and in the accuracy of the operators.

The device consists of three range finders mounted on a framework after the manner of the rungs of a ladder, or in cascade. Each range finder is enclosed in a box or jacket filled with heat-insulating and absorbing material which serves to protect the instrument from the sun's rays, cold, moisture and rust, and against every and any element that might cause expansion, contraction or distortion of the base-tube of the range finder, which would materially affect the accuracy of the measurements. Seats are provided for the three observers, while a fourth seat somewhere off to one side is provided for the operator who manipulates the controls which cause the entire device to swing around so as to face in any direction. —*Scientific American*, 4/8.

NAVIGATION AND RADIO

ACOUSTIC EFFICIENCY OF FOG-SIGNAL MACHINERY.—In 1873 the Trinity House Corporation conducted a long series of experiments from the South Foreland on the audibility of fog signals. A committee of the Elder Brethren had paid a visit to the United States in the previous year, and they had the assistance of their scientific adviser, Professor Tyndall, whose memoir on the "Atmosphere as a Vehicle of Sound" was published in the philosophical transactions of 1904. The main conclusions of the Trinity House report were: The passage of sound is not impeded by fog or by falling snow and rain; the most powerful sound-producing instrument is the siren in use in the United States, but even that could not be relied upon at distances exceeding 3 miles; sound shadows (zones of silence) are formed by the intervention of the shore or interference of sound waves; an opposing wind greatly obstructs and diverts the sound waves, and even a clear atmosphere may be rendered flocculent to sound by invisible acoustic clouds formed by air currents of different temperatures and humidity. It is difficult to harmonize the first and the last of these conclusions. In these experiments the audibility was entirely estimated by the ear, on which the navigator himself relies, of course; but individual imperfections may seriously affect the results. In the experiments of 1874, by the United States Lighthouse Board, Joseph Henry attempted physical estimates of the sound intensity by making use of Chladni figures; in general, the report of General Duane and himself agreed with the Trinity House report, though Tyndall and Henry clashed as to the interpretation of certain phenomena. In the further American experiments of 1894, by Livermore, White and Hazen, quantitative estimates of the sound intensity were made and entered on the charts of the ship tracks by the breadth of the line marking the track.

When, in 1901, Trinity House resumed the investigation from St. Katherine's Point, Isle of Wight, Lord Rayleigh was their scientific adviser and Sir Thomas Matthews their engineer. Rayleigh's contribution to the *Philosophical Magazine* of 1903, on the "Production and Distribution of Sound," dealt chiefly with the scientific side of the problems. Disc sirens proved superior to cylinder sirens, especially in calm weather; of reed horns, the stentor answered best. For sending sound in all directions mushroom-head trumpets were found efficient, and the elliptical form of Rayleigh gave better results than the circular form. For calm weather a low pitch (180 periods) seemed recommendable; a note of high pitch penetrated further against an opposing wind. Raising the air pressure above the usual 25 pounds per square inch proved of little use. The most striking resulting feature was the very low acoustic efficiency of the sirens. To make a siren audible 8 miles out at sea required 100 horsepower on a favorable day; the high note consumed 130 horsepower; with the 7-inch disc siren the maximum pressure change (condensation) observed in the sound wave was only 1/180 atmosphere when the siren was worked at 25 pounds pressure. Clearly there was much waste of energy in the siren and its trumpet. The chief interest in the French experiments of 1908 by C. Ribière lies in his attempts to find suitable methods of measurements. He tried membranes, phonographs, interferometers, etc., with some success in the laboratory, but none of his methods would answer on ships or in boats. But he drew attention to a point long since known, but insufficiently studied and appreciated, viz., that explosive waves (from detonations, guns, etc.) travel at higher speed than sound, and he considered the waves from sirens to be of this explosive character. This point requires consideration.

In his "Théorie du Son" of 1808 Poisson had already pointed out that only infinitesimal sound waves would be propagated at constant length and velocity. But he did not develop the theory. This was done by Earnshaw, Riemann, Rankine, Stokes, Hugoniot and, finally, by Rayleigh, in 1878 and 1910; yet there are difficulties left. The crests of finite, large waves tend to gain on the troughs; the crests thus become steeper, and finally overtake the troughs, and discontinuity (or a bore) sets in. Across a surface of discontinuity there is an abrupt change of density and velocity; the wave as such breaks up; viscosity and thermal conductivity tend to check the discontinuity. According to Rayleigh, the only wave which can escape ultimate discontinuity is a wave of rarefaction (not a wave of condensation), which has no forward slope. But he studied the phenomenon chiefly with respect to the discontinuity wave in front of a flying bullet, and did not dwell on the actual propagation of air waves at speeds exceeding that of sound. P. Duhem, 1909, spoke of propagation *des ondes de choc*, which is perhaps a more explicit term; but he also treats the subject mathematically. Vieille found that detonation reports (high explosives) were propagated at two and three times the velocity of sound. When he ruptured a thin metal diaphragm by a pressure of 27 atm. he observed twice the velocity of sound.

For these reasons instruments suitable for quantitative measurements on sound waves may be unsuitable for the study of siren signals. That was the consideration from which Dr. L. Vessot King, of Cambridge, started experimenting when at McGill University, Montreal. Dr. King became interested in these problems when cruising with Professor H. T. Barnes in the Gulf of St. Lawrence, in his studies of iceberg dangers. He appealed to Professor A. G. Webster, of Clark University, Worcester, Mass., whose "Complete Apparatus for the Measurement of Sound" was mentioned in our British Association report of 1910, and with the aid of the Webster phonometer, of a thermodynamical instrument of his own, and of the diaphone of Mr. J. P. Northey, of Toronto, he has been able to enter upon an inquiry into the acoustic efficiency of foghorns, which promises to help the engineer to better types of foghorns and to supply

him with a basis for the science of acoustic engineering, a branch so far densely enveloped by that haze which the navigator has so much reason to dread. Last winter Dr. King lectured in the Franklin Institute on his experiments, which the war interrupted (see Journal of the Franklin Institute, March, 1917). We will first describe the diaphone.

In the Northey diaphone, which has found favor in Canada, a hollow piston moves in a horizontal cylinder which is surrounded by an exterior stationary cylinder. The latter is charged with air at a pressure of 25 pounds per square inch, and the compressed air enters the piston when circular slots in the piston communicate with similar slots in the inner cylinder; the movement of the piston is produced by an arrangement of the compressed air riveter type. The air leaves the piston through a short conical trumpet, which is said to yield a pure note (pitch, 180 periods) at great distance, even when the working air-pressure fluctuates considerably. The diaphone gives two blasts of 3 seconds each per minute. One peculiar feature of the diaphone note was quite unexpected, but was afterwards purposely emphasized. At the end of a blast the piston slows down, and as a result the pitch diminishes to a powerful terminal note, a "grunt," which helps sailors to determine the direction of the signal and to distinguish it from ships' sirens.

To understand the difficulties of the phonometer we must remember that the actual changes in air-pressure, and in the displacements of air particles to which a travelling sound wave gives rise, are very small. Experimenting on just audible sounds of pitch 181 (the pitch of the diaphone, it will be noticed), Boltzmann and Töpler observed, in 1870, air-pressure changes amounting to 9.2×10^{-8} atm. and displacements of 0.19×10^{-6} cm., whilst Rayleigh (1877) found 6×10^{-8} atm. and 0.127×10^{-6} cm. for the higher pitch of 256. Now the wave-length of yellow light is only 6×10^{-6} cm., and according to Rayleigh the stream of energy, *i. e.*, the amount of energy in just audible sound waves crossing unit area per second, is about the same as that of an ordinary candle seen at a distance of 3000 m. Thus the human eye and ear respond to approximately the same minimum energy, though the ear is otherwise considered the more perfect organ, as it is sensitive to a far greater range of frequency.

The intensity of light and sound is supposed to decrease with the square of the distance. But that law is not more than a rough approximation in the case of sound. Taking Boltzmann's figures, King calculated that the expenditure of energy at the resonator of the acoustic waves, which he heard at 10 miles distance (which was not the maximum attained) should have been less than ⅓ horsepower, assuming the inverse square law to hold, whilst the engine was actually working continuously at 10 horsepower to compress air for the very short blasts. We have already called attention to the excessive power absorbed by the Scottish siren at St. Katherine's Point. These results suggest both waste of power in the machinery and the inapplicability of the inverse square law, *i. e.*, sound waves are not propagated through air without loss of energy.

The Webster phonometer is a Helmholtz resonator consisting of two cylinders sliding the one inside the other so as to make volume and pitch adjustable. The one end of the cylinder is pierced by a small hole, the other closed by a mica diaphragm. With ordinary sound waves the vibrations of this diaphragm can only be measured by optical interference; this is done with the standard laboratory phonometer. The instrument of King operates somewhat like a combined phonograph and mirror galvanometer. A steel point is attached to the diaphragm and presses against a steel strip carrying a concave mirror; the vibrations tilt the strip, and a wavy band is produced, the width of which is a measure of the amplitude of the waves. To calibrate a phonometer, another of these instruments is used as a sound producer or phone. In this way Webster found the acoustic efficiency of a violin to be 0.00052, that of a cornet twice as great, and that of the human voice 0.0095, or nearly 1 per cent, a surprisingly high figure. The King

phonometer was used on board. But it was not suited, owing to the explosive character of the siren waves, for energy measurements at the diaphone. In those measurements King depended upon determining the lowering of the temperature by the expanding air. Coils of fine iron wire (0.001 inch thick) were suspended by silk threads in the valve on the compressor side and in the trumpet, about 5 inches in front of the piston; and the temperature difference between the two coils was measured by means of a bridge and a portable galvanometer. Compensation had to be applied for the heating of the coils by the air rushing past them.

With these instruments Dr. King, assisted by Mr. H. H. Hemming, conducted observations in August and September, 1913, from the fog-signal station at Father Point, near Rimouski, on the southern bank of the St. Lawrence, the width of which there already exceeds 30 miles at the station and on the tender Lady Evelyn, or on a boat. Taking as his efficiency unit the amount of work that air at a certain compression would be able to do on an adiabatic cycle if all the energy were converted into sound in the diaphone, Mr. King obtained efficiencies of 6 per cent and even 8 per cent at pressures of 20 pound per square inch (above the atmosphere), and he considers that in the since-improved diaphone that efficiency has been doubled. In one of his best experiments he calculated that power was being transmitted across an area of 14 square inches (5 inches from the piston) at the rate of 2.36 horsepower, *i. e.*, that amount of horsepower was utilized in sound transmission; the pitch was 175 periods; the amplitude of pressure 0.128 atm., of displacement 1.08 inch, the maximum velocity of a particle in the sound wave 99 feet per second, and the average velocity of the air, deduced from the rate of air consumption, 137 feet per second. The compression and rarefaction of the air (at about 0.1 atm. pressure fluctuation) should give rise to temperature fluctuations of 12° C., and the sound wave from the diaphone would soon become discontinuous; but the experiments could not be resumed in 1914 to investigate these problems.

The position of the ship or boat (the latter up to two miles from the station) was determined by sextants, and meteorological observations were also taken. The ship's course was traced on the chart, as above-mentioned, on a line the thickness or width of which indicated the observed intensity of the sound. Thus a wavy line was obtained, thick and irregular near the shore, where the pier and shore features interfered with regular sound propagation, and becoming thinner and more regular at greater distance, and not showing sometimes any very marked diminution in intensity with distance. One of the few charts reproduced extends to a distance of 8 miles, and the sounds appear to have been stronger again beyond 6 miles and to have lost little in intensity during the last 2 or 3 miles. The swellings to the right and the left of the line were not equal generally, probably because the wind was mostly blowing from one side. The wind proved to be the predominant factor in the variability of the sound propagation; but there were also zones of silence, and the wavy swellings distinctly show a periodicity to which Dr. King merely refers. Two charts, also reproduced, concern trips on the tender in circular arcs about the lighthouse as center, one at a radius of about half a mile, the other at 1 mile; here the shore influences are very strong; the pier cut off almost all the sounds near the shore.

Much further experimenting will, of course, be required. But the new instruments should be of great assistance in the design of foghorns and also in selecting the proper site for foghorn stations, a question of equal importance.—*Engineering*, 20/7.

PORTLAND HARBOR.—The Rivers and Harbors bill recently passed at Washington carries an appropriation of $300,000 to dredge Portland harbor channel to a depth of 35 feet. It is stated that when the harbor is deepened so as to admit vessels of large draft it will be utilized by Canada for war shipments.—*Shipping Illustrated*, 4/8.

WRECK OF THE "YANKEE."—The work of removing the wreck of the old U. S. S. *Yankee* off New Bedford, Mass., is progressing. The Merritt-Chapman Co., who bought the wreck from the United States, after all efforts to raise it failed, is now blowing it up. Thousands of tons of metal are being shipped to New York as junk, but it is expected that most of the engines can be salved. The wrecking company made a price reported to be about $11,000 to remove the wreck, but it will receive much more in the sale of old junk which comes from the hull of the sunken craft. —*Shipping Illustrated*, 4/8.

RADIO LABORATORY.—The Secretary of Commerce has asked Congress to appropriate $40,000 additional funds for the construction of a radio laboratory.

Secretary Redfield makes the following statement:

"In the sundry civil bill approved July 1, 1916, $50,000 was appropriated for this purpose. Owing to the unprecedented increase in the price of labor and materials since the estimate on which this appropriation was prepared, it is found that the building as originally projected cannot be built for less than $90,000.

"It is inadvisable to revise the plans so as to provide for the construction of a smaller building to come within the limits of the appropriation made by Congress.

"The need for a laboratory to be used for fundamental scientific research in connection with radio communication is so urgent at this time that I feel that the construction of this laboratory building should not be deferred. The building is needed now by the War and Navy Departments to aid in research work on problems connected with radio telegraphy.

"Both the Secretary of War and the Secretary of the Navy approve of the plan for the immediate construction of this laboratory building at the increased cost, and have definitely stated that the providing of a place to carry on research work is most necessary to the proper development of radio telegraphy."

Secretary Baker says:

"It will give me great pleasure to join you in any effort to secure the allotment of additional funds for the immediate construction of the laboratory. I know of no scientific assistance possible to the War Department upon which I should set higher value."

Secretary Daniels says:

"The projected radio laboratory building for the bureau of standards is considered an essential feature in connection with the art of radio telegraphy, and in connection with tests and research work necessary in supplying naval vessels and shore radio stations with efficient, adequate, and standard equipment, and it is therefore recommended that this laboratory be completed at an early date.

"Although the Navy Department has adequate facilities for supply and test of standard apparatus at navy yards, and for manufacturing a certain percentage of radio equipment at navy yards, there is no place provided to carry on research work, which is most necessary to the proper development of any art such as radio.

"It is recommended that an additional allotment of funds be obtained for the erection at once of the proposed building."—*Army and Navy Register*, 4/8.

ENGLAND SUSPENDS ALL TRANSATLANTIC WIRELESS.—A London dispatch dated August 4 said:

"The Marconi Company announces that from midnight, August 4, its transatlantic service, both eastbound and westbound, will be discontinued, this action being taken upon instructions from the government.

"Godfrey Isaacs, managing director, says it is purely a necessary war measure."

Notification that the British Government had decided to suspend all wireless traffic between this country and England reached the offices of the Marconi Wireless Telegraph Company of America and the Western Union Telegraph Company August 4. According to the Marconi and Western Union officials, no reason was given for the suspension of wireless service further than that the step was occasioned by military necessity.

"Military necessity," however, is assumed to mean at the offices of both companies that the British Government feared the transmission of important military information to the enemy under the guise of harmless messages of a personal or business nature.

It is believed that the British wireless censorship has encountered several attempts on the part of persons, presumably alien enemies, in the United States to send information of an apparently harmless nature to destinations in neutral countries and thence into Germany. It was said that the strictest censorship might prevail and yet there would be no way of being certain that a harmless message to some one in Holland or Sweden did not actually reveal by some secret understanding an important military plan.—*N. Y. Times,* 5/8.

NEW ITALIAN RADIO SYSTEM.—A Rome dispatch says that the Minister of Marine is planning to establish a powerful wireless station which will be constructed on a new system, radically different from that adopted thus far by all the big European companies.

It is hoped that by making a record in rapidity of construction it will be possible to open the new station soon.—*N. Y. Times,* 8/8.

RUSH MESSAGES.—The Navy Department has arranged for the expedition of "life and death" messages passing between the officers and enlisted men of the navy and their families. Telegrams of such a nature are to be dispatched to the Bureau of Navigation at Washington and will be forwarded by telegraph or cable immediately to the proper naval station or ship. Other messages will pursue a slower means of transmission.

Commander D. W. Todd, Director of Naval Communications, has sent the following letter to the presidents of the Western Union and Postal Telegraph companies:

"Orders have been issued to all naval personnel serving in the fleet directing them to inform their families that life and death telegrams are to be forwarded addressed to ships, care of the Bureau of Navigation, Washington, D. C. For example:

John Smith,
U. S. S. *Texas,*
Care Bureau of Navigation,
Navy Department, Washington, D. C.

"Telegrams of less importance are to be forwarded from distant points with the same form of address, with the understanding that such telegrams will be forwarded by the Bureau of Navigation to the addressee by mail. The above orders have been issued to prevent land line messages from disclosing the location of ships of the navy.

"It is requested that proper steps be taken in your organization to notify senders of telegrams of this order of the Navy Department.

"Publicity is being given this matter in the press."—*N. Y. Times,* 29/7.

TEUTONIC RADIO INSTALLATIONS IN MEXICO.—The following dispatches appeared in the *New York Times* August 13:

Mexico City, Aug. 12.—The discovery of a new pirate ship in the Gulf of Mexico, together with disclosure of a wireless station at Champton, Campeche, which was hidden in the hills near the mouth of the Champton River, lends color to a story of suspicious ships seen in the gulf.

The activity of Germans in purchasing copper, glycerine and rubber, paying more than the market prices, indicates a renewal of German plotting. Reports reaching Mexico City say that many Germans are congregating in Yucatan at the southern part of the gulf. Owing to the part that the Mexican Government has no revenue cutters it is possible to hide supplies along the coast of Yucatan without detection.

Government officials are sure that the Germans are supplying rebels in the southern part of Tabasco with ammunition, probably brought from Central America. Local German merchants are aiding pro-German papers in pushing an anti-American campaign by displaying anti-American posters in their windows.

Mexico City, Aug. 11.—What is believed to have been a German information forwarding station has been discovered by Mexican officers on Lobos Island, a lighthouse station off the coast northeast of Tuxpam.

The Mexican authorities believe that the station might have been converted into a submarine or naval base had it not been located by them.

The government recently decided to place a wireless station on Lobos Island, and when Manuel Rodriguez Gutierrez, Sub-Secretary of Communications, went to Tampico on a trip of inspection he sent Alberto Mendez, Chief of the Wireless Department of Communications, to the island.

On his arrival at the island Mendez found a complete wireless plant in operation. It had been built by the lighthouse keeper, who formerly was a mechanic. He was unable to give a satisfactory account of how he obtained the wireless apparatus, and he was placed under arrest.

Mendez also learned that a launch which had made the island its headquarters had been carrying supplies, arms, and ammunitions to rebels on the mainland, who had been interrupting traffic around Tuxpam and interferring with the oil business. The launch was confiscated.

As Mendez, with the keeper a prisoner, started for the mainland in a lighthouse tender, another vessel put off from the mainland and followed the tender until it was within the 3-mile limit.

Mendez has made a full report and the government is conducting a rigid investigation. Its agents are scouring the coast in search of other wireless plants.

ENGINEERING

NAVAL FUEL SITUATION.—The provisions of the recently enacted food-control law includes the government control of fuel as well as of foods and feeds. This bears directly upon the supply of fuel, coal and oil, for the miiitary-naval establishment, with special reference to the needs of the navy. There is no present expectation of resort to the provisions of this new law to aid the naval service in obtaining fuel. No great difficulty has as yet been encountered in that direction. There have been numerous problems, such as that of the price of coal, which has been referred to the federal trade commission. There is no apprehension of a shortage of supply of either coal or oil that will seriously hamper naval operations. Some comment has been invoked by the prospect that the acquisition of some 75,000 motor trucks and automobiles for military use and the addition by nearly 400 submarine chasers and an unmentioned number of destroyers to the navy will have its influence upon the consumption of oil, and it has been asserted that the shortage on account of the demands of the present war will amount to more than 120,000,000 barrels. Estimates of this sort are not founded on anything which justifies such an aggregate. The pending legislation which relates to the control of oil lands, mostly in California, for the benefit of the naval needs and which contemplates the transfer from the Navy Department to the bureau of mines of the task of inspecting naval fuel appears to be in no immediate danger of adoption. The protests of the Secretary of the Navy and of the chief of the bureau

of steam engineering have evidently retarded the progress of this decidedly harmful legislative project. The situation, on the whole, is regarded with complacency by the naval authorities, who are inclined to take the view that the supply of coal and oil is not likely to be restricted to a detrimental extent, and if such a condition prevails, the provisions of the food-control law would probably come to the relief of the authorities who are responsible for keeping the warships supplied with an adequate quantity of fuel.—*Army and Navy Register*, 11/8.

CONDENSER TUBE CORROSION.—The following letter from the chief engineer of the Compagnie des Messageries Maritimes to the "Editor" appeared in *Engineering* July 27:

"*To the Editor of Engineering.*—Sir: I have read in your issue of July 13 the very interesting and very complete article by Mr. William Ramsay on "Condenser Tube Corrosion." The corrosion of condenser tubes is a question which preoccupies the mind of all French engineers whose duty it is to keep marine engines, both those of warships and those of merchant vessels, in a good state of maintenance and repair, and it is an undeniable fact that when the difficult problem of the conservation of these tubes has received a satisfactory solution a great service will have been rendered to navigation. It is incumbent upon all to contribute to that end, and, in this view, I beg to ask you to put the following facts before Mr. Ramsay.

"Formerly—over 20 years ago—the Compagnie des Messageries Maritimes, in the use it made of tubes of French manufacture, found no abnormal wear or corrosion in its condensers; the nests of tubes were replaced only after a more or less lengthy period of years, the tubes having simply become regularly thinner by long service.

"Condenser-tube sickness broke out rather suddenly in about the year 1895; it fell only upon the tubes of more recent French manufacture. The ships were the same, they ran on the same routes and between the same harbors, the engines also were the same, but, nevertheless, the newer tubes became rapidly perforated, sometimes on the first trip, whilst the tubes of the older class, and still in service, continued to stand well.

"We thereupon experimented with British Admiralty tubes. Their wear was longer than that of the tubes of more recent French make, but was much inferior to that of the older tubes. The replacing of tubes became more and more frequent, leading to considerable expenditure.

"Owing to the increase in the use of electrical installations on board we immediately looked for a possible influence of current leakages, but our researches very rapidly showed us that the cause of the evil was not in that direction.

"We thereupon asked a chemical engineer, Mr. Guillemin, to study the question of corrosion, and we gave him three tube specimens, without adding any data either as regards their make or as to the manner in which each behaved in service. One was from a tube of the older French manufacture, one from a British Admiralty tube, the third being from a French tube of recent make.

After ascertaining that the alloys of the three were practically the same, Mr. Guillemin examined the tubes micrographically, and found that the texture was essentially different in the three specimens. That of the French tube of earlier manufacture was almost entirely amorphous; in the British tube it was made up of small crystals, and in the tube of recent French manufacture of large crystals. In this latter the length of some crystals was equal to the thickness of the tube—they ran through the thickness.

"The research led Mr. Guillemin to formulate an electrothermic theory showing that a tube will better resist corrosion when its texture is more extensively amorphous, and that the three specimens would of a necessity

behave very differently, the most resistant being the tube of former French manufacture, and the least resistant being the one of recent French manufacture.

"This conclusion was in complete agreement with the results shown in actual service, which results were not indicated to the experimentalist, in order not to influence his research.

"The texture of brass varies with the extent of cold working and the temperature of annealing. The physical properties of the metal, and notably its ductility vary at the same time, this latter property being greater for the crystalline than for the amorphous texture. It might, therefore, have been expected that the tubes of ductile brass would become more rapidly scored than the others. We had, in fact, noted that the tubes sufficiently ductile to allow the tightening of the ferrule in the tube plate to deform the metal and leave an impression on the tube were more rapidly and more extensively perforated than those of hard and brittle metal which did not allow of such a deformation.

"An example is given in Mr. Ramsay's article which appears to corroborate the above; it is that of the furrowed tube, in which the furrowed portion—the texture of which was certainly different from that of the smooth portion—was the one almost exclusively corroded.

"It may, I think, be interesting, and perhaps also useful, to Mr. Ramsay to receive the above account.

"Yours faithfully,

"E. RAYMOND,
"Chief Engineer,
"Compagnie des Messageries Maritimes.

"1, Rue Vignon, Paris."

AERONAUTICS

ARMY AVIATION ACT.—The bill appropriating $640,000,000 for aviation purposes in the army passed the Senate on July 21 without amendment and without a record vote. Less than one hour was consumed in its consideration and most of that period was devoted to Senator Hardwick's proposed amendment against authorizing drafting of the men for the aerial service. The amendment was rejected 66 to 12, after Senators La Follette and Gronna had made brief speeches opposing draft.

Senator Calder, of New York, offered an amendment to draft all aliens, except enemy subjects, but was prevailed on to withdraw it.

The bill as offered by the President is as follows:

Be it enacted, etc., That for and during the existing emergency the President be, and is hereby, authorized to increase the present authorized commissioned and enlisted strength of the signal corps of the army, including the aviation section thereof.

Sec. 2. That to provide the additional commissioned personnel required by this act the President is authorized to promote, appoint, detail, or attach as temporary officers in the signal corps, including the aviation section thereof, officers of the Regular Army, National Army, or National Guard, or the Officers' Reserve Corps, or to appoint temporarily enlisted men of the Regular Army, enlisted men of the Enlisted Reserve Corps, or persons from civil life: Provided, That no person shall be so promoted, appointed, detailed, or attached until he shall have been found physically, mentally, and morally qualified under regulations prescribed by the Secretary of War: Provided further, That officers with rank not above colonel shall be appointed and commissioned by the President alone, irrespective of the rank or grade held by them on the date of the passage of this act, and that officers above the grade of colonel shall be appointed by the President, by and with the advice and consent of the Senate, irrespective of the rank or grade held by them on the date of the passage of this act.

Sec. 3. That to provide the additional enlisted men required by this act the President is authorized to raise and maintain, by voluntary enlistment or by draft, such number of enlisted men as he may deem necessary and to embody them into organizations, hereinafter provided for in section 4: Provided, That the draft herein provided for shall not apply to any person under the age of 21 years or to any person above the age of 31 years: Provided further, That the grades of chauffeur, first class, and chauffeur are hereby created in the signal corps. The pay and allowances of a chauffeur, first class, shall be the same as a sergeant, first class, in the signal corps. Pay and allowances of a chauffeur shall be the same as a sergeant in the signal corps. All chauffeurs while serving as such shall rank with corporals of the signal corps and shall be subject to promotion and reduction to any other grade now authorized in the signal corps.

Sec. 4. That the President is hereby authorized to appropriately officer and organize the personnel of the signal corps into such number of divisions, brigades, regiments, wings, squadrons, battalions, companies, and flights as may be necessary, and to increase or decrease the number of organizations prescribed for the divisions, brigades, regiments, wings, squadrons, battalions, companies, and flights, and to prescribe such new and different organizations and personnel for divisions, brigades, regiments, wings, squadrons, battalions, companies and flights as the efficiency of the service may require.

The President is further authorized to organize such headquarters and headquarters detachments for divisions, brigades, regiments, wings, squadrons, battalions, companies, and flights as may be necessary, and to prescribe new and different organizations for such headquarters and headquarters detachments whenever the efficiency of the service may require.

Sec. 5. That the President, by and with the advice and consent of the Senate, is authorized to appoint for the period of the existing emergency such general officers or appropriate grades as may be necessary for staff duty and for duty with such brigades and divisions of the troops of the signal corps, including the aviation section thereof, as may be organized by the President.

Vacancies in all grades of the Regular Army, National Army, or National Guard resulting from the temporary appointment of officers thereof to higher grades shall be filled or vacated as provided for in sections 8 and 9 of the act authorizing the President to increase temporarily the military establishment of the United States and approved May 18, 1917.

Sec. 6. That officers detailed in or attached to the aviation section of the signal corps may, when qualified therefor, be rated as junior military aviators, military aviators, junior military aeronauts, and military aeronauts, but no person shall be so rated until there shall have been issued to him a certificate to the effect that he is qualified for the rating, and no certificate shall be issued to any person until an examining board, which shall be composed of two officers of experience of the aviation section of the signal corps and one medical officer, shall have examined him under general regulations to be prescribed by the Secretary of War and published to the army by the War Department, and shall have reported him to be qualified for the rating. No person shall receive the rating of military aviator or military aeronaut until he shall have served creditably for three years as an aviation officer with the rating of a junior military aviator or the rating of a junior military aeronaut, except that in time of war any officer or enlisted man who specially distinguishes himself in active service may, upon recommendation of the chief signal officer of the army, be rated as a junior military aviator, military aviator, junior military aeronaut, or military aeronaut without regard to examination or to length of service: Provided, That junior military aeronauts and military aeronauts shall be entitled to the same increase in rank and pay as are now authorized by law for junior military aviators and military aviators, respectively: Provided further, That any officer attached to the aviation section of the signal corps

for any military duty requiring him to make regular and frequent flights shall receive an increase of 25 per cent of the pay of his grade and length of service under his commission.

Sec. 7. That the Secretary of War is authorized from time to time to cause such number of the enlisted men of the aviation section of the signal corps above the grade of corporal as he may deem necessary to be rated as aviation mechanicians or as balloon mechanicians in the manner now prescribed by law: Provided, That balloon mechanicians shall receive the same increase of pay as now prescribed by law for aviation mechanicians.

Sec. 8. That all officers and enlisted men of the temporary forces of the signal corps, including the aviation section thereof provided for herein, shall be in all respects on the same footing as to pay, allowances, and pensions as permanent officers and enlisted men of corresponding grades and length of service in the Regular Army.

Provided, That nothing in this act shall operate to decrease the present authorized strength of the Regular Army or National Army heretofore authorized by law.

Sec. 9. That during the existing emergency authority is hereby given to the President, through the War Department, for the purchase, manufacture, maintenance, repair, and operation of airships and other aerial machines including instruments and appliances of every sort and description necessary for the operation, construction, or equipment of all types of aircraft, including guns, armament, ammunition, and all necessary spare parts and equipment connected therewith; and all necessary buildings for equipment and personnel in the aviation section and for the purchase, maintenance, repair, and operation, through the chief signal officer of the army, of all motor-propelled passenger and equipment-carrying vehicles which may be necessary for the aviation section of the signal corps.

And during the existing emergency authority is hereby further given for the establishment, equipment, maintenance, and operation of aviation stations, including (a) the acquisition of land, or any interest in land, with any buildings and improvements thereon, by purchase, lease, donation, condemnation, or otherwise: Provided, That by order of the President any unappropriated or reserved public lands may be reserved from entry designated, and used for such aviation stations; (b) the improvement of such land by clearing, grading, draining, seeding, and otherwise making the same suitable for the purpose intended; (c) the construction, maintenance, and repair of permanent or temporary barracks, quarters, hospitals, mess houses, administration, instructional and recreational buildings, hangars, magazines, storehouses, sheds, shops, garages, boathouses, docks, radio stations, laboratories, observation stations, and all other buildings and introducing water, electric light and power, telephones, telegraph, and sewerage to aviation stations and buildings and structures thereon by the extension of existing systems or the creation of new systems and their maintenance, operation and repair, installation of plumbing, electric fixtures and telephones, fire apparatus and fire alarm systems; (d) and the maintenance, operation, and repair of all such systems, fixtures and apparatus; (e) construction and repair of roads, walks, sea walls, breakwaters, bridges and wharves, dredging, filling and otherwise improving land and water sites; (f) purchase of stoves and other cooking and heating apparatus, kitchen and tableware, and furniture and equipment for kitchens, mess halls, offices, quarters, barracks, hospitals, and other buildings, screens, lockers, refrigerators, and all other necessary equipment; (g) purchase of gasoline, oil, fuel, and all supplies of every kind and character necessary or advisable for maintenance and operation, of aviation stations, including electric light and power, telephones, water supply, and sewerage service; (h) purchase and manufacture and installation of all kinds of machinery, tools, material, supplies, and equipment for construction, maintenance, and repair of aircraft, buildings, and improvements at aviation stations, or property or appliances used in connection with aviation.

And also for the purchase or manufacture and issue of special clothing, wearing apparel, and similar equipment for aviation purposes.

And also for the actual and necessary expenses of officers, enlisted men, and civilian employees of the army and authorized agents sent on special duty at home and abroad for aviation purposes, including observation and investigation of foreign military operations and organization, manufacture of aircraft and engines; also special courses in foreign aviation schools and manufacturing establishments, to be paid upon certificates of the Secretary of War certifying that the expenditures were necessary for military purposes.

And also for vocational training, including employment of necessary civilian instructors in important trades related to aviation, purchase of tools, equipment, materials, and machines required for such training; purchase of textbooks, books of reference, scientific and professional papers, periodicals and magazines, and instruments and material for theoretical and practical instruction at aviation schools and stations, and all other means to carry out the provisions of section 27 of the act approved June 3, 1916, authorizing, in addition to the military training of soldiers while in active service, means for securing educational and vocational training of a character to increase their military efficiency and enable them to return to civil life better equipped for industrial, commercial, and general business occupations.

And also to pay and otherwise provide for such officers of the Officers' Reserve Corps of the aviation section of the signal corps and such enlisted men of the Enlisted Reserve Corps of the aviation section of the signal corps as may be called into active service and such enlisted men as may be enlisted in the aviation section of the signal corps under the provisions of section 2 of the act to increase temporarily the military establishment of the United States, approved May 18, 1917, or any subsequent act temporarily increasing the commissioned or enlisted personnel of the aviation section of the signal corps and such civilian employees as may be necessary, for the payment of their traveling and other necessary expenses when not traveling with troops: Provided, That, hereafter, all reserve officers and enlisted men of the aviation section of the signal corps shall be paid by quartermaster corps disbursing officers from funds transferred to their credit from signal corps appropriations.

And also for the payment of all expenses in connection with the development of suitable types of aviation engines, airplanes, and other aircraft appurtenances, including the cost of sample engines, airplanes, and appurtenances, cost of any patents and other rights therein, and costs of investigation, experimentation, and research in respect thereto.

And also for the payment of all expenses in connection with the creation, expansion, acquisition, and development of plants, factories, and establishments for the manufacture of airplanes, aircraft, engines, and appurtenances, including provision for the purchase or lease of land with the buildings thereon, construction of permanent or temporary buildings for all purposes, purchase of machinery, tools, and employment of operatives, together with all administrative expenses necessary, the purchase and supply of raw and semi-finished materials and of fuel and all other things necessary for creating and extending the production of airplanes, aircraft, engines, and all appurtenances.

And also for creating, maintaining, and operating at technical schools and colleges courses of instruction for aviation students, including cost of instruction, equipment, and supplies necessary for instruction and subsistence of students while receiving such instruction.

Provided, That, subject to the approval of the Secretary of War, motor-propelled vehicles, airplanes, engines, parts thereof, and appurtenances may be exchanged in part payment for new equipment of the same or similar character to be used for the same purpose as those proposed to be exchanged.

Provided further, That during the present emergency, officers and enlisted men of foreign armies attached to the aviation section of the signal corps as instructors or inspectors when traveling in the United States on official business pertaining to the aviation section of the signal corps shall be authorized, from funds appropriated by this act the same mileage and transportation allowances as are authorized for officers or enlisted men of the Regular Army.

Sec. 10. That for the purpose of carrying this act into effect the sum of $640,000,000 is hereby appropriated, out of any funds in the treasury not otherwise appropriated, to be available until June 30, 1918.—*Army and Navy Journal*, 28/7.

President Wilson July 24 signed the largest appropriation bill, carrying funds for a single project, ever presented to any President when he attached his name to the $640,000,000 war aircraft bill which had just been put through Congress in record time. This bill passed the House in four hours and the Senate in a single afternoon. It provides the funds with which it is hoped that the United States will be able to fill the air along the Western Front in Europe with thousands of American aviators and military airplanes.

As soon as the President had signed the bill, Howard Coffin, as Chairman of the Aircraft Production Board of the Council of National Defence, issued a statement in which he said that the $640,000,000 program must be carried out promptly.

"We are prepared to go ahead at once," said Mr. Coffin, "with the expanded plans which the appropriation makes possible." But he warned the country not to look for results too soon.

"The program for which $640,000,000 has been prepared by the bill," said Mr. Coffin, "must be carried out with a promptness equal to that displayed by Congress in passing the measure. It is a task demanding all the initiative and power of American industry for its consummation, and, just for that reason, one to which the nation will respond.

"All world's records for industrial development of a new art must be broken. Whatever crime may later be laid at the door of those who are to direct this work, that of inaction or slowness in accomplishment must not be one of them. We are prepared to go ahead at once with the expanded plans which the appropriation makes possible.

"One word of caution only need be said here. Time, material, and organization are the main elements in any manufacturing industry. Under ordinary conditions at least a year would be required for the industrial preparation which this program demands. Yet we have no such length of time in which to perform the task now.

"In every other country there is a shortage of materials for aircraft construction. In every other country there is a shortage of the type of men required for the air service. In spite of our previous inexperience in quantity production of fighting planes, we must have thousands of them for next year's use to make the contribution which the Allies expect of us.

"The design and construction of jigs, tools, and gauges will require weeks, and even months, no matter how rapidly we work. It must be remembered, therefore, that a few months will necessarily elapse before the outward results of our industrial effort will show in the shape of quantities of finished fighting machines.

"We cannot get aircraft merely by 'shaking the trees.' It can be announced, however, that most gratifying progress on the preliminary organization already has been made during the last few weeks. If it progresses in the future at the stride that has been developed there need be no fear as to America's position in the aircraft field by next summer.

"The difficulties which apply to the production of high-powered machines for fighting and bombing purposes fortunately do not apply with equal force to the training program. Within a comparatively short time we shall have enough of the type required for training the thousands of

men who will constitute a contribution to the winning of the war equal in importance to the production of machines.

"America is the last great reservoir of material for war pilots as well as for airplanes. Already three of the 24 big new training fields are completed, and instruction on them has begun. Others are being rushed to completion. Orders for training machines were placed weeks ago, and shipments of the first output already have been made. The output of this most necessary type will continue to increase rapidly, as we already have plants experienced in their manufacture.

"In considering the size of the appropriation it must be borne in mind that less than half this amount is to be expended in the purchase of airplanes alone. Personnel, training, equipment, overseas maintenance, spare parts, flying stations, armament, and scientific apparatus, all are to be provided for, and are equally as important as the manufacture of the machines. One hundred and ten thousand officers and enlisted men—an army of the air greater than our standing army of a few months ago—will be needed. The whole project is one which appeals to the imagination of our people and to the genius of our American engineers."—*N. Y. Times*, 25/7.

NAVAL AIRPLANE CONSTRUCTION.—Construction of an aircraft factory at the League Island Navy Yard, Philadelphia, to cost approximately $1,000,000 and to be completed in 100 days, was ordered August 8 by Secretary Daniels. The plant will employ two thousand workers and will be capable of producing a thousand small aeroplanes yearly.

"In view of the enormous expansion of the airplane industry now being undertaken in the United States," said the Secretary, in announcing his decision, "it was felt that it was necessary to increase the Navy Department's facilities along these lines, not only to enable it to supply a part, at least, of its own needs, but in order that the private plants might be relieved of the experimental development which they have hitherto undertaken and turn their whole attention to the maximum production of approved types.

"The Navy Department has a small flying field at the League Island Navy Yard adjacent to the factory, and excellent facilities for hydroplanes, so that, it will be able to utilize this plant to keep the navy in the forefront with the latest developments in aircraft."

The navy's air program is a separate undertaking from the great $640,000,000 aircraft act. A large sum for naval aircraft production is understood still to be available from recent appropriations. Mr. Daniels has asked Congress for additional funds for the purpose, which he hopes will be supplied by the time payment for the new factory must be made. —*N. Y. Herald*, 8/8.

NEW FLYING BOAT.—Army aeronautical experts expect effective results from a new type of hydroaeroplane recently perfected by the Curtiss company. It is said to be well adapted to all the purposes of modern war in the air, and particularly well adapted to coast patrol.

The new machine differs from prevailing types principally in the fact that the motor is installed in the body of the "boat," instead of over the operator's head. Another innovation is an appliance which gives the operator power to cut loose entirely from the planes, throwing the power of his engine to a regulation marine propeller for aquatic propulsion.

In this way it is expected that the peril of rough weather work—the bane of coast patrol—will be eliminated to a large extent. If sudden gales necessitate a descent to the surface of the sea the aviator simply converts his machine into a motor boat. The new plane is equipped with an engine of 250 horsepower.—*New York Times*, 29/7.

FOREIGN COMMENT.—The United States Secretary of War is reported to have said some little time ago:

"According to the best information obtainable, there are about 7,000,000 men on the Western Front, and the addition of a few infantry units, while of great moral value, means little in forcing a decision. A few thousand trained airmen, however, with machines for their use, may spell the difference between victory and defeat. America must make sure that the Allies, and not Germany, secure the permanent domination in the air within the year. It is now certain that if we made the effort we can send enough men and machines within the year to be of great value, and perhaps turn the scale, without handicapping our plans for the army which is to follow, nor hindering the vital flow of food and munitions. American airmen and aeroplanes may turn the tide. They furnish us the opportunity for immediate service in the fighting line."

We have already had the satisfaction of knowing that a representative contingent of the magnificent manhood of America has landed in France, and the American Escadrille in the French Aviation Service had made a name for itself long before the United States elected to join the Allies in fighting for freedom and the rights of mankind. In principle the views taken by the United States Secretary of War are undeniably sound, and American aid in overhead warfare will be most welcome. But when we come to details, such as the training of several thousand airmen and supplying them with machines within the year, while we realize the splendid spirit which prompts the government and the people of the United States, we have to consider whether, with the very few instructors who can be spared from the fighting line and the varied and peculiar nature of the instruction to be imparted, the time-limit for training is not too short. Also, we know that the United States has hitherto supplied us with aeroplanes suitable for training purposes, we appreciate at its full value the American record for the production of automobile engines in large numbers by methods of standardization; but there are such differences between the former and the fighting and bombing machines used on the Western Front, and between the design and working of automobile and aero-engines and the work required of each, that we doubt the possibility of standardization of the latter at present, or if the standardizing process is applicable to the aero-engine designed for military service in any case. As regards *personnel*, in the first instance we may say at once the United States should possess, and will undoubtedly enrol very quickly, the very class of youthful manhood which is pre-eminently suitable by character, physique, temperament and inclination for the air service. What duties will they be expected to perform and how long will it require to train the average candidate for those duties?

In the British and French Corps on the Western Front the object they have in view is briefly to co-operate with the other branches of the service in the one supreme end of securing victory, but though it can be thus summarized, the duties included are varied. Let us take, for instance, the work done and results achieved by British airmen during the Messines operations, already well known to the public. The chief ways of cooperation are observation for general movements of the enemy, furnishing information to the General Staff by photographic methods, oral, wireless and written reports, "spotting" for the guns, finding out what is going on behind the enemy lines, harassing the enemy by bombing his nerve centers and lines of communication, supporting the infantry by machine gun-fire during an attack and preventing the enemy airmen from performing corresponding services for their side. The result of the training of our splendid Royal Flying Corps was shown during these operations in the absolute local mastery of the air which we obtained. For days before the commencement of the "push" our General Staff were kept informed of every detail of the enemy's visible defences from overhead observation; he could neither dig trenches, move guns, nor send a single train or convoy

of ammunition or stores along road or rail without our knowledge. Though the enemy possessed great advantage of high ground, from which he could observe every movement of our troops, our General Staff were so well served by the air service that they were at least on equal terms of observation with the enemy.

In the meanwhile, and directly our infantry went "over the top," the enemy aerodromes were attacked, his nerve centers bombarded, his convoys and reinforcements harassed. The special airmen detailed for observation duties began to send in information of the progress of events to the General Staff and the artillery, varied in nature, of wonderful accuracy and great value, including the progress made by our attacking troops, the massing of enemy infantry behind their lines, such of the enemy gun positions as had been successfully concealed up to the moment of attack, the true nature of dummy gun emplacements put up to draw our artillery fire and the results of the latter. Thanks to the airmen, in fact, our gunners were enabled to utilize to the fullest extent our now established superiority in guns and munitions, while this superiority rightly directed enabled us to destroy the enemy's defences, pave the way for our infantry to attack, and reduce their losses to a minimum. The qualification for the successful performance of duties such as those in co-operation with other troops involves long and arduous specialized training, and for observation a knowledge of military matters, apart from aviation, the use of machine-guns and aeroplanes in the involved complex fighting with enemy airmen equally well equipped with aircraft for fighting purposes, and practice in the dropping of explosives on terrestrial targets with effect, observation for artillery, and the use of wireless in aircraft.

It does not seem possible for the United States Army to furnish a contingent of airmen trained on the above lines, of the size indicated by the Secretary of War, within a year for co-operation with the allied troops, but what could be done, and done well within the time limit he has given, is to train a large contingent of airmen for the exclusive purpose of carrying the bombardment of the enemy nerve-centers, more especially his sources of munition supply, further behind the enemy lines, thus enabling the British and French airmen to concentrate their efforts on local co-operation with the troops in the field in the manner already indicated. American aid could then be given very effectively on the Western Front and in the immediate future.

The teaching of flying to candidates suitable for the air service could be done in America. It is probable that the remainder of their instruction, after passing a certain standard in aviation pure and simple, could be better accomplished in Europe. They would have to get accustomed to local peculiarities in any case and the machinery of instruction, including flying officers already experienced in aerial work against the Germans—the only instructors who would be really qualified for their training—could be more usefully and economically employed in aviation camps in France than if they were sent to America.

The American airmen for this contingent would require to be able to manage large bombing aeroplanes, to fly in formation with other machines under orders, to drop explosives accurately, and on occasion to use a machine gun in self-defence. They could leave out of their training aerial fighting in the elaborate form now practised, observation for military purposes, and "spotting" for the guns, and thus considerably reduce the period occupied in instruction.

When American genius produces, as it undoubtedly will in time, an aeroplane with engine of the size, stability, speed and lifting capacity suitable for a bombing machine, and its value has been proved in actual work on the spot, no one will be more pleased than we shall to welcome its employment in such large numbers as can be obtained by standardization alone within the next 12 months, but in the meantime we venture to think that a beginning might advantageously be made by building the first few

hundred machines to British and French designs of proved suitability without prejudice as regards future output.—*The Army and Navy Gazette*, 14/7.

MANUFACTURERS FACE GREAT TASKS.—From facts supplied him by Major W. L. B. Rees of the British Mission, Waldemar Kaempffert, editor of the *Popular Science Monthly*, has written a review of the war progress of aviation which gives a graphic idea of the things which must be accomplished by American airplane builders in order to fulfill what Secretary of War Baker has called America's pledge to the Allies—to give them the unquestioned supremacy of the air for the rest of the war. Major Rees was sent to this country to give the officers of the American Army Aviation Service the benefit of British experience on European battlefields. Major Rees is an officer of the Royal Flying Corps and has brought down single-handed ten German army fliers.

"The general staff of every European army knew five years ago that the airplane would prove a potent factor in war. Germans, English, French, Italians, all had tried to evolve a system of air scouting in their annual maneuvers," Mr. Kaempffert writes. "The Italian campaign against the Turks in Tripoli and the Balkan wars had proved clearly enough that a man in the air could see more than a man on horseback.

"And yet all the European generals entered this war without even a dim realization of the terrible demands that would be made on the aircraft; on their utter dependence on a handful of dauntless men ready to vault into the air and brave not only the unseen whirlpools and malestroms of a turbulent atmosphere, but bursting shells hurled from the ground and the machine gun-fire of an adroit enemy air-fighter; of the inadequacy of the airplane as it was built before the fateful month of August, 1914, when all Europe was plunged into carnage; and of the frightful wastage of lives and machines.

"Every army had machines—the French and Germans hundreds of them. But no one knew that airplanes would have to be built for very special military purposes; that the same machine could not effectively be used for scouting and fighting; that the acrobatic performances of Pegoud and his imitators in 'looping the loop' and diving tail first would be elevated to the dignity of military tactics with which every fighting airman would have to be familiar. In two years the whole art of airplane construction has been almost miraculously improved and the art of flying, too. Before the war some effort had been made to adapt the machine to the man; now the man must adapt himself to the machine."

Mr. Kaempffert points out that six machines have been evolved as the result of war experience:

1. The fighter—a 150-mile-an-hour single-seated airplane, armed with a machine gun; which has limited fuel capacity and which serves to find, fight, and destroy the enemy.

2. The two-seated fighter, carrying a fixed machine gun at the front and another machine gun on an all-round mount for the observer in the rear. It is not as fast as the single-seated fighter. It fights the enemy, but also escorts fire control machines. It has more fuel capacity than the single-seated fighter and can stay up longer.

3. The reconnoissance machine is armed like the two-seated fighter; but it is not so fast, nor does it climb as rapidly. If it goes far it must be protected by faster machines.

4. The fire control airplane directs the batteries by means of wireless. A reconnoissance machine fitted with wireless may be used for fire control.

5. The bomb dropper resembles the two-seated fighter, although bombs can be carried by various machines. Bomb carriers are large.

6. Night fliers resemble either the reconnaissance machine or two-seated fighters.

"It was a very heterogeneous collection of machines that took the air at the outbreak of the war," writes Mr. Kaempffert; "monoplanes with

tractor propellers, biplanes with both tractor and pusher propellers, machines with and without streamline bodies, fast racers and slow cross-country fliers. One would suppose that the military brains of Europe would have foreseen that some effort would be made to beat off a prying air scout. That it was foreseen the rather crude anti-aircraft artillery evolved before the war proves; but no one could foresee how combats at a height of ten and twenty thousand feet would be fought, or how a machine should be designed for effective fighting. Maneuvers in time of peace may teach much, but blank cartridges can never teach as much as cold lead.

"There was no air fighting in the Tripolitan and Balkan campaigns, but in this war there was air fighting almost from the beginning. At first rifles and pistols were used. They proved worthless. A machine gun alone could be used effectively, something that would squirt death like water from a hose. But the machine gun implied the building of an airplane able to mount and fire it. Now, it was soon found that the pusher type of airplane, which carries its propeller in the rear, is not so fast as the tractor, which carries its propeller in the front. It was also found that, for fighting at least, quick maneuvering ability is highly essential, which implies a small, high-powered machine carrying only one man. Here was a very difficult technical problem to be solved: The fighting machine had to be a tractor for speed; the propeller in front necessarily interfered with the proper manipulation of the machine gun; the officer in the pilot's seat had not only to keep his machine on an even keel, but also to fight his gun.

"Curiously enough, the problem of firing through the propeller had been solved before the war by some imaginative inventor with more vision than is given to academically trained generals, and, curiously enough, it was solved in both France and Germany simultaneously. The solution was this: The gun was rigidly mounted in front of the pilot, and was mechanically coupled with the engine. A propeller revolves at about 1200 revolutions a minute; a machine gun fires at the rate of 600 shots a minute. Let the engine fire the gun at just that fraction of a second when no propeller blade intervenes—that is the solution.

"Because the gun is rigidly mounted, the air fighter must turn the entire machine toward the German enemy to fire it. The enemy does the same, for the German Fokker, an adaptation of the French Moranne-Saulnier, is similarly designed and equipped with a fixed machine gun.

"When these fighters first appeared on the side of the Allies they drove everything before them. It was impossible for the slower Germans to cope with them. Then the Fokker appeared. The machines of the Allies were made still faster; the fighters became more skillful, more daring; fighting tactics were evolved. As a result, the Allies have not only caught up with each German improvement but have surpassed it. It is rarely that German machines—fighters or scouts—appear over the French and British lines, but the machines of the Allies are always over the German lines. That meant much at Arras.

"When these fast fighters first made their appearance there were some single-handed combats. A German and British charioteer of the air would wheel about, jockeying for a position in which, for a few fleeting seconds, either might pour in a hundred bullets at his enemy. It was a favorite maneuver of the German flier to rise very high, to plunge down on an adversary, and to fire as he came. But Boelcke and Immelmann were about the only fliers on the German side who were either skillful or daring enough to engage in frequent single combats. As a rule, the Germans attached a single British or French machine in twos or threes. The procedure may be attributed in part to the different temperaments of Germans and British, and in part to military policy.

"The result has been that fighting in the air is now undertaken, as a rule, only by squadrons. Six machines, sometimes more, constitute an aerial tactical unit. Their pilot officers live together, sleep together, eat together. They know one another better than if they were brothers.

Every mental and emotional characteristic is bared. So it happens that in the air, when the six machines are flying side by side, the men know instinctively what they are to do. Have you not seen flocks of birds on the wing, circling about with a unanimity of understanding that makes it seem as if they were obeying a command? It is so with the air fighters of a squadron. They move as one, like a flock of birds, with never a word of instruction.

"An engagement between opposing squadrons in the air is not like a battle at sea—a fight between fleets. Around and around each other the planes whirl, each team following the leaders with clock-like precision and automaticity. The opposing squadrons watch and watch each other. Woe betide the man who lags behind for a second, who manipulates his controls a little too carelessly; who is not quite *en rapport* with the teammate in the machine beside him! Two machines of the enemy swoop down. He is cut off from his fellows like a bird from a flock. He must fight now for his life. Up and down, in and out, he maneuvers with his foes. He shoots when he can—when a hostile machine is directly in front of him. But enemies outnumber him. He cannot out-maneuver two machines. One, at least, must sooner or later swing around into a favorable position. Then there is a squirting of bullets. The machine drops, a mass of flames, three miles to the earth.

"Whenever that terrible artillery preparation takes place of which we read in the newspapers, the deadly hail of tons and tons of metal that precedes an attack with the bayonet, the fighting squadrons are high in the air—20,000 feet above the ground. Below them, at perhaps 10,000 feet, are the two-seated fighters and reconnaissance machines, each patrolling a section of the enemy's line, taking hundreds of photographs. And below, at 6000 feet, are the machines that control the artillery fire—machines that watch each shot as it falls, and that wireless back the signal 'too short' or 'too long.' Without the reconnaissance officers the scouts and the fire controllers would not be able to perform their task; they would be attacked and annihilated by fast airplanes mounting machine guns. To be sure, they are armed themselves, so that they can keep up a running fight. But on the daring fighting squadrons far, far above the battle line, depends the fate of an army; on them depends the possibility of gathering the facts that the heavy artillery in the rear must have to fire at a mark 10 miles distant.

"To the All-seeing eye in the air nothing is concealed. It is that eye which has made it utterly impossible for either side to execute a flank movement that would envelop a whole army and compel a surrender; that eye which has made it necessary for armies to burrow in the ground and face each other in a nerve-racking, soul-trying struggle."—*N. Y. Times*, 21/7.

INTERCHANGE OF PATENTS.—The formation of the Manufacturers' Aircraft Association has ended, it is believed for all time, the litigation with regard to airplane patents, chiefly between the Curtiss and Wright interests. It has brought about a combination which is open to "any responsible manufacturer of aircraft, or any one who intends to become a bona fide producer, or any manufacturer to whom the United States Government has given a contract for the construction of 10 or more airplanes, or any person, firm or corporation owning or controlling United States patents relating to airplanes." In other words, for the first time and under war pressure an American industry has been organized as a unit.

Any new member of the association who introduces new designs or patents of value will be paid for them at a rate to be determined by the Board of Arbitration, which is to be appointed soon. It is declared by officials of the company that this cannot be held to be in any way a combination in restraint of trade, since it is open to any one. Moreover, while the necessities of the war brought about the combination, it was suggested

before the war—in January last—when, according to the statement issued by the association, the Secretary of War and the Secretary of the Navy asked the National Advisory Committee on Aeronautics to recommend some way out of the difficult situation created by the patent litigation between the Wright and Curtiss interests.

It is believed that the economic saving will be brought about by the interchange of all airplane patents, especially since those controlled by the Wright and Curtiss interests are considerably more valuable than any others that have yet appeared, will make it to the obvious interest of members to continue in the arrangement regardless of war or peace.

The organization of the combination involves the payment of $2,000,000 in royalties to the Wright interests and an equal sum to the Curtiss interests as royalties on their patents. This money is to be obtained from a royalty of $200 paid by each member on each machine constructed—approximately 1 per cent, of the average gross value of a completed airplane with its full equipment. Of this $135 will be paid to the Wright interests and $40 to Curtiss until the Wright $2,000,000 has all been paid, after which $175 will go to the Curtiss interests until their royalties are equally satisfied. The residue of $25 on each machine is to go to the general fund of the association. When the Curtiss and Wright royalties are all paid the whole amount will go to the general fund.

Out of this will be paid the royalties on subsequent designs and inventions which are approved by the Board of Arbitration, as well as the general expenses of the association. It is to be used, after the Wright and Curtiss royalties are out of the way, for the general development of the aircraft industry, and eventually part of it may be pro-rated and returned to the individual composing members.

Every member of the corporation further contracts that if it leases any of its patents to any outside manufacturer for the production of airplanes or motors a royalty of 1 per cent—which, roughly will be equivalent to the $200 internal royalty—shall be paid to the Manufacturers' Aircraft Association.

This, presumably, will cover the great business in the manufacture of airplane motors and of airplanes themselves, which will probably be carried on ultimately for purely war purposes by industrial corporations which have hitherto had nothing to do with the airplane business, but are going into it solely in order to meet the needs of America and her Allies during the war. How extensive this business will be is not yet known; the statements frequently made that airplanes can be produced in almost unlimited quantity, after a little preliminary preparation, by manufacturers of automobiles, typewriters and other products which are turned out in great quantities, have not been borne out to any great extent by the experience of government officials in charge of the aircraft situation so far.

Ultimately, indeed, it is expected that there can be a great increase of production through these methods; but such expansion requires first, the designing and construction of an enormous quantity of tools and will necessitate in most cases not an alteration of the existing plant, but the construction of an entirely new one. At present, and in the immediate future, the airplane needs of America are to be met almost entirely by the existing aircraft manufacturers, and their treaty of peace and federation, ending patent litigation and throwing open to the united aircraft industry of America the total national production of ideas and designs in the airplane field, is expected to give a great impetus to production and to prove of such economic value in wartime that it will be continued after the war is over.—*N. Y. Times*, 7/8.

BRITISH CONSTRUCTION.—The output of aircraft in Great Britain is increasing, according to Dr. Addison, Minister of Munitions. He stated that since last January, when the Ministry became responsible to the flying services for supply, the program had been steadily and largely increased.

It was still expanding, and no limit could be set to it until the country had enough airplanes and seaplanes, both for attack and defence.

"No fewer than 100 factories are engaged on some process or other connected with the construction and equipment of the flying machine," Dr. Addison said. "Output is increasing by leaps and bounds. If for the purpose of comparison you put the number of airplanes produced in May, 1916, at 100, then in May of this year the number rose to rather more than 300. Even this rate of increase is being accelerated. The output in December will be twice what it was in April and the December total will be far surpassed in succeeding months. The number of airplane engines turned out monthly has been more than doubled this year already, and this total will be doubled again before the close of the year.

"A growing number of workers are employed in the airplane factories, the increase in the last five months being 25 per cent on the previous total. To meet the demand for labor special schools have been started all over the country, where a training of about two months qualifies a pupil to carry out some simple process in airplane manufacture."

Dr. Addison also declared that special difficulties had to be overcome. Speed, climbing power, and armament have continually increased and improved.

"Where there is no finality there is a limit to standardization except in small details, and the problem of supervising the manufacture of our airplanes is correspondingly complicated," he said.

The Minister stated that the variety of materials used in airplane manufacture has been a source of anxiety and the needs of the airplane enormous, almost passing belief. More spruce is wanted than the present annual output of the United States, more mahogany than Honduras can supply, all the linen of the type made in Ireland, and the whole of the alloyed steel produced in England can be used, and to meet the needs of the air service for flax, the government had actually to provide the seed from which to grow the plant essential for its purpose.—*N. Y. Times*, 29/7.

WOOD SHORTAGE.—Success in carrying out the program of the Aircraft Production Board depends upon getting out the wood for the wings and bodies of the aeroplanes. That information was obtained by the *Herald* in official quarters August 9.

The only kind of wood which has been found to possess all of the essential qualities for such construction is Sitka spruce, which is found principally in Oregon and Washington. Spruce somewhat similar to Sitka spruce is found in smaller quantities in North Carolina and West Virginia.

There is no dearth of such timber, but the demand for it in the last three years has increased so greatly as to exceed the ability of the lumbermen to handle it. The mills also have been taxed to the limit of their capacities, and in spite of expansions and an increase in the number of mills it is not yet possible to make the supply equal the demand.

Prior to the outbreak of the war the price of Sitka spruce was not more than $100 a thousand. The wood has been used by the Allies almost exclusively in the construction of their aircraft, and the enormous demand caused the price to rise to $200 a thousand.

The average aeroplane requires not more than 200 feet of wood for its construction, but until the recent standardization in sawing specifications was affected by the conference between the representatives of the spruce manufactures and the aircraft experts of the allied governments and the United States it had been necessary to cut approximately 1000 feet to get out the desired amount of timber for one aeroplane.

Constant efforts are being made to find some other wood that can be substituted for spruce, but up to the present time none has been found which combines the qualities of strength, lightness and flexibility, each of which is absolutely essential and all of which are possessed by spruce.

After being turned out of the mills the wood must be thoroughly dried before it is available and that has been done heretofore in the open air,

which has required several months. It is believed, however, that two processes have been found recently by which the wood can be dried in kilns without reducing its flexibility. If the processes prove to be a success it will mean a great saving of time in manufacture and will enable the manufacturers to speed up the production of aeroplanes. In view of the fact that speed is a most important factor to the success of the United States and its Allies in obtaining permanent dominancy of the air, the value of the process cannot be overestimated.

Difficulties in transportation arising from the constant demand for freight cars constitute a serious handicap in carrying out the program of the board. The factories at which the aeroplanes are being constructed or at which the various parts are being assembled are located principally in the Middle West, but it is believed that none of those that may be erected will be located in the Far West, because it is less expensive to transport the raw material than the finished product.

The output of spruce for the year 1916 was 33,000,000 feet, virtually all of which was used in the construction of aircraft. This year, in order to meet the enormous demand created by the program of the United States, the production must be greatly in excess of that amount.

It is conceded by officials familiar with the situation that there are great difficulties to be overcome and that no certain method except indefatigable effort has yet been devised for assuring success.

One of the results accomplished by the conferences between the lumber men and the aircraft experts was that the former offered to make the price of $105 a thousand for spruce, and it is believed the War Industries Board will recommend the acceptance of a figure approximating that amount.

The timber is in the woods, the mills are being increased in size and number, and, as one of the officials said, "I don't know how it is going to be done, but it must be done, and so, of course, it will."—*N. Y. Herald,* 10/8.

HANDLEY PAGE BATTLEPLANE.—The battleplane recently constructed for the British Admiralty by Mr. Handley Page, while not as large as the huge 1200 horsepower Curtiss triplane delivered to the Admiralty, is still of good size. It has a span of about 98 feet, a length of 65 feet, and a height of 20 feet. Seats are provided for five people, and mountings are available for three Lewis guns. The craft is propelled by two 12-cylinder Rolls-Royce motors of 280 horsepower. During a recent flight this Handley Page battleplane carried 20 passengers and pilot to a height of 7180 feet.—*Scientific American,* 11/8.

EMERGENCY RATIONS FOR AIR SERVICE.—During a discussion in Parliament recently the First Lord of the Admiralty was asked what arrangements, if any, are made to supply pilots of aeroplanes and all airmen bound on long-distance oversea flights with emergency rations and with facilities for obtaining drinking water when flying in machines with air-cooled motors or for tapping the radiator for drinking water in machines with water-cooled motors. In answering the question Dr. MacNamara stated that emergency rations, consisting of malted milk, Bovril and chocolate are supplied to Royal Navy air stations for the use of pilots of seaplanes and airmen engaged in oversea flights. Drinking facilities are provided for by the issue of thermos flasks. No facilities have been provided for tapping the radiators of water-cooled motors, the contents of which are more likely to act medicinally than otherwise.—*Scientific American,* 11/8.

WHAT THE GERMANS THINK OF RIVAL AIR SERVICES.—In a recent interview with a Dutch journalist, General von Hoeppner, commander-in-chief of the German air service, stated that the German aviators have won the supremacy over their enemies, although the Entente airmen on the Western Front were numerically superior. On the Eastern Front, however, Germany

is rather stronger, while in the Balkans the balance is again in favor of the enemy. The British, he said, showed in air fights that they are of the Germanic race, for they seek fight, and fight until either they or their opponents are killed. German aeroplanes generally are better than those of the enemy, though the new English Sopwith triplanes are excellent. The technical preparedness of the French he described as middling, and that of the British inferior. "While we Germans consider every flight as a military act," stated the General, "for the British flying is but sport, and, when it comes to a fight, good sport. The German is a soldier first. Our German military training cannot be outdone by Britain's three years' war-waging."—*Scientific American*, 11/8.

CONTROL OF AIR SERVICE.—Plans have been completed for bringing all American aviation forces in France under a single direction, working in conjunction with other military units.

Airplane squadrons will be divided into two classes, tactical and strategic. The former will operate within a range of 25 kilometers, and the latter within a range of 200 kilometers. The tactical units will co-operate directly with the troops, doing preliminary reconnoitering, pursuing enemy aviators, and bombarding enemy establishments. The strategic squadrons in general will operate independently. They will be engaged in destroying enemy defences and attacking supply bases, depots, and factories. They will also take part in squadron fighting and day and night bombardments.

Observation balloons will be used largely as an adjunct to the artillery.

It is ordered that hereafter the names of no American officers except Major General Pershing and Major General Sibert be mentioned in news dispatches.—*N. Y. Times*, 24/7.

THE GIANT CAPRONI WARPLANE.—Italy leads in types of bombing and gun carrying aeroplanes.

The following are some of the most important types of Italian aeroplanes, the types which, if built by the thousands will make it possible for the Allies to conduct the major aerial operation against Germany which are to ensure her downfall:

(1) The 1800-horsepower Caproni triplane. This remarkable warplane is equipped with three 600-horsepower Fiat motors. The details about this machine are kept secret, but it is known that the machine, as a whole, follows the characteristics of the Caproni warplanes. This machine, judged by the smaller types, must carry about five tons of explosives and fuel for 12 hours, at a speed of about 80 miles an hour.

(2) The 600-horsepower bombing type Caproni triplane. This machine, is a triplane, with two fuselages, equipped with three Fiat or Isotta-Fraschini motors, two in front fitted with one propeller respectively, and one in the rear, also fitted with one propeller. Each of the engines is independent of the others, so that if two of the engines should stop, the machine could still keep in the air with the power of one motor. This machine carries a useful load of 4400 pounds, which permits carrying fuel for six hours, a crew of three people, three guns, and 2750 pounds of bombs. It has a speed of close to 80 miles an hour, and is capable of climbing 3250 feet in 13 minutes, 6500 feet in 27 minutes, and 10,000 feet in 57 minutes.

(3) The 600-horsepower bombing type Caproni biplane. This type of machine is most remarkable for its speed, which is 92 miles per hour. It is equipped with three Fiat or Isotta-Fraschini motors of 200 horsepower, and three propellers, two tractors and one pusher; it carries a military load of 3200 pounds, including fuel for four hours, a crew of three, three Fiat guns and 1150 pounds of bombs. It can climb 3250 feet in 6 minutes 30 seconds, 6500 feet in 14 minutes 35 seconds, 10,000 feet in 35 minutes 30 seconds, 13,000 feet in 40 minutes.

(4) The 450-horsepower bombing type Caproni biplane. This remarkable bomb-dropping gun-carrying machine has been used most effectively

for the past two years by the Italians. This is a biplane with two fuselages and three 150 horsepower Isotta-Fraschini motors, two in front and one in the rear, two tractors and one pusher. It carries 2200 pounds of useful load, which is usually divided into fuel for four hours, a crew of three, three guns, and 450 pounds of bombs. It has a speed of 85 miles an hour, and a climb of 3250 feet in 5 minutes and 30 seconds, 6500 feet in 12 minutes 10 seconds, 10,000 feet in 21 minutes, and 13,000 feet in 30 minutes.

(5) The 200-horsepower S. I. A-7B armed reconnaissance biplane. This machine is a two-seater tractor biplane, equipped with a 200-horsepower Fiat engine, carrying a useful load of four hours' fuel, two people, two Fiat guns, firing through the propeller, and 135 pounds of bombs. It has a speed of 118 miles an hour, and a climbing speed of 3250 feet in 3 minutes, 6500 feet in 7 minutes 30 seconds, 10,000 feet in 12 minutes and 13,000 feet in 19 minutes.

Besides the above, Italy has developed several other efficient types of seaplanes and fighting aeroplanes, including the Macchi seaplane, which has a speed of over 110 miles an hour; the Pomilio gun-carrying biplane, with a speed of 108 miles an hour, and the S. V., single-seater fighting tractor, which is reported to give a speed of close to 140 miles an hour (close to the ground) and to have a climbing ability of 10,000 feet in 8 minutes.

No other country has a line of efficient aeroplanes that equals Italy's. The Caproni triplanes and biplanes are being put to use now by France and England, and the authorities see in them the solution of the problem of conducting aerial operations against the German military and naval bases.—*Flying*, August.

ZEPPELIN BOMB DROPPING MECHANISM.—The bomb dropping mechanism of a Zeppelin captured by the British was described in a recent number of the *London Sphere*. There are 60 bomb droppers for conical bombs. The base is slung in straps, and there is a strap around the neck. The latter has a releasing hook and when the releasing hook is operated the small end first drops down and the base slides out of its straps. The bomb then rights itself and drops base downward. The bombs are slung in one or two lines along the under side of the mail hull. The releasing hook is operated by an electro-magnet, and there is a small switchboard in the cabin for controlling the release. Each bomb has a separate switch. The bombs can be released by hand levers also in case the electric means fail. Each bomb has a safety device and is not "alive" until it has dropped several hundred feet.—*Flying*, August.

NEED OF SILENCERS TO ELIMINATE NOISE OF APPROACH.—Silencers are needed on aeroplane engines to eliminate the noise of approach, which is the only thing that warns the enemy of the approaching warplanes at night. The silencers must do their work thoroughly, eliminating the exhaust sounds entirely, because the anti-aircraft units have very powerful microphones that magnify the slightest sound.

Lacking silencers—for no reason other than the added weight and slight loss of power—raiding aeroplanes are forced to fly at high altitudes in an attempt to escape detection. The weight of the fuel needed and the horsepower and time spent in evading detection this way represents really a greater loss of efficiency than the loss caused by the silencers.—*Flying*, August.

NIGHT LANDING LIGHTS.—In England during the early days of Zeppelin raids, the casualties resulting to pilots who went up at night to attack Zeppelins was very high. This was mostly due to two things: (1) An insufficient number and badly lighted night landing grounds; (2) Lack of lighting devices on the machines.

These conditions resulted in a tremendous handicap to our pilots. In one instance 15 pilots went up and 12 crashed on landing. But these conditions no longer exist. A pilot who finds himself with engine trouble and forced to come down from any place over London from a height of 6000 feet has only to fire his recognition signal from a Verys pistol to have at least one aerodrome within easy gliding distance brilliantly lighted, where he can land with absolute safety.

In addition to the Verys pistol, night flying machines are specially equipped with a parachute flare. This is fired electrically from the pilot's seat through a tube. On release, the electric connection is made and the flare, unfolding a couple of hundred feet, explodes, releasing a small silk parachute with a very bright light attached. This illuminates the country for a radius of approximately a quarter of a mile, and gives the pilot a chance to select a desirable landing ground. In addition to this, are attached to the machine:

(1) *Holt's Landing Lights.*—These are flares attached to the underside of the wing tips, and ignited electrically. Upon connection being made, these ignite, throwing a very strong light downward which is reflected downward by the wings, and so does not dazzle the pilot, and if the ground is practicable for landing, he may easily make off a perfectly good forced landing.

(2) *Electric Head Lights.*—These are not arranged the same way on all machines. Some have a single light slung just underneath the fuselage, and others one on each wing tip. These lamps are merely very powerful automobile head lamps, very well stream-lined, and the pilot can switch them on or off at will. They are used in a similar manner to the Holt's landing lights.—*Flying*, August.

NAVIGATION LIGHTS.—These are composed of one light in the tail and one on each wing tip. The wing tip lights show a white light forward, a green light on the starboard side, and a red on the port side. The power for these electric landing lights is obtained from a small dynamo driven by a miniature propeller.

There is one small disadvantage in the use of Holt's landing lights; that is, that if the machine crashes on landing before the lights have finished burning, they may very easily set fire to the whole machine. In using the parachute flare the pilot should always carry a short stick, about 3 feet long, so that in case the flare jams in the tube, for many reasons he can poke it through with the stick, for if he does not there is a chance of the flare exploding inboard and setting fire to the whole machine.—*Flying*, August.

FIGHTING ON THREE DIFFERENT LEVELS.—In describing the work of the airmen at the front, Major L. W. B. Rees of the British flying corps, stated recently that the British fly on three levels with three kinds of machines. The lowest are the artillery directors, who circle about in big figure eights some 6000 feet above the enemy trenches and flash back directions to the British gunners by wireless. Above them at 10,000 feet, are the heavy fighters with two men to a machine and able to keep the air for four hours at a speed of 110 miles per hour. At a height of 15,000 feet are the single-man, light fighters, capable of 130 miles an hour and of ascending the first 10,000 feet in 10 minutes.—*Scientific American*, 11/8.

TO TRAIN AMERICAN AIRMEN IN EUROPE.—Paris, August 8.—It was announced at the American Aviation Service to-day that American airmen had been picked to enter British, French and Italian aviation schools in order to complete their training at the earliest possible moment. The problem of obtaining quickly the most efficient airplanes has been solved in part by the purchase of all available materials from the Entente Allies, thus permitting the Americans to begin their aerial operations much sooner

than otherwise would be the case. The service has been divided into purchasing and operating divisions.

Officers in the American service emphasize their belief that nothing should interfere with the aviation plans in the United States. The officers say that where one man is needed in the reserve for each man in the trenches, in aviation, to insure American protection and supremacy, it is estimated that five reserve men are needed for each man flying.—*N. Y. Herald*, 8/8.

MERCHANT MARINE

SHIPPING BOARD.—William Denman has retired from the chairmanship of the United States Shipping Board as the result of his row with General Goethals, General Manager of the Emergency Fleet Corporation, whose resignation the President has also accepted. John B. White has also retired from the board, being succeeded by Bainbridge Colby, of New York. The new chairman of the board is Edward N. Hurley, ex-chairman of the Federal Trade Commission. Chief Constructor W. L. Capps, U. S. N., has been appointed to replace General Goethals.—*Shipping Illustrated*, 28/7.

LEGAL STAFF RESIGNS IN A BODY.—The entire legal staff of the Emergency Fleet Corporation has quit in a body, because of sympathy, it is said, with Major General George W. Goethals, whose resignation as general manager of the corporation was accepted recently by President Wilson.

On the staff are some of the country's best known lawyers. They are George Ruble, a former member of the Federal Trade Commission; Joseph P. Cotton, George H. Savage and Charles P. Howland, of New York, and Edward B. Burling, of Chicago. All except Mr. Savage were serving without pay.

It was learned the lawyers felt they should go out with General Goethals and that Rear Admiral Capps, now general manager, should be left free to choose his own associates.

The staff has held on since General Goethals left, it is understood, only because its members desired to give the new management all the information they could concerning legal questions considered by the old organization.—*Washington Post*, 11/8.

GENERAL GOETHALS A GREAT NATIONAL ASSET.—Although the American public is not saying much, it is doing some very close thinking about the amazing treatment accorded to General Goethals in the matter of building our new merchant fleet.

The American people are asking themselves why, in getting rid of that arch obstructionist, Denman, it was necessary to sacrifice the most distinguished military engineer in America. Denman, a politician and a non-technical layman, undertook to say what kind of ships should be built for our new fleet. Goethals, a hydraulic engineer and executive of wide experience and unequaled record, believed that the course proposed by Denman would be damaging to the interests of the United States in the great crisis of the present war. Soldier that he is, General Goethals would have been guilty of a grave breach of duty had he not fought against the Denman policies with his whole strength. Doubtless, the General knew only too well that in fighting Denman he was fighting some hidden forces; therefore his brave and uncompromising attitude must be regarded as a fine expression of moral courage and patriotic devotion.

Mr. Bernard Baker, one of the best authorities on mercantile marine in the country, was retired in order to make room for Denman, and the reason for this selection still remains a mystery. Undoubtedly there was general rejoicing over the exit of Denman from a stage upon which he played the part of unconscious, or willful, obstructionist—we leave it to him to say which. He worked out his own downfall in a brief three

months; but these were important months and the delay may prove a very serious factor later on in the war.

It was doubtless with extreme regret that the President found it necessary to sacrifice General Goethals, who, it is understood, was his own appointee; but evidently he considered this the simplest way to cut the Gordian Knot. It would seem, nevertheless, that there was due to this able and distinguished engineer some reward for the seeming ill treatment he has received, and that his services should not be lost to the country.

For the builder of the Panama Canal is a great national asset. He is just the kind of able and fearless man of which the country stands so greatly in need during the present stupendous crisis. It will be a monstrous injustice to the man, and will put unspeakable shame upon the country which he has served so well, if he is to go around, hat in hand, begging for some job in which he may be useful during the great emergency.

There must be more than one position in which the country could utilize General Goethals' great abilities. First and foremost, there comes to our mind the fact that he is essentially a hydraulic engineer, and that, therefore, he would be pre-eminently qualified to superintend the task of building the North Sea net. Goethals made good at Panama and he would make good in the North Sea.

In the selection of Rear Admiral Capps to succeed General Goethals, the President has made an admirable choice. As former Chief Constructor of the Navy and Chief of the Bureau of Construction and Repair, Rear Admiral Capps proved to be an able and fearless executive. His technical ability was recognized in his selection to head the American Committee sent to London to confer on the changes in ship construction called for by the loss of the *Titanic*.—*Scientific American*, 11/8.

CONTRACTS.—The new shipping board is adhering to the policy of former Chairman Denman and General Goethals, which is to decline to give out information as to contracts. General Goethals adopted this rule as a war measure.—*Shipping Illustrated*, 4/8.

VESSEL OWNERS AND SEAMEN MAKE WAR AGREEMENT.—American seamen and their employers have come to a full agreement on wages and working conditions during the war, which government officials said solves the problem of obtaining sufficient men to operate the great merchant fleet the country is building.

Announcement of the understanding was made by the Department of Labor, which with the Department of Commerce and the Shipping Board assisted in the negotiations. The agreement was signed by a committee of 16 representing employers, employees, and the three government agencies. The committee was named at a conference here last week of all interests concerned. Pacific coast and lake seamen and employers who were not present at the conference are expected to enter the agreement.

The wage scale was fixed as follows: Sailors and firemen, $60 a month; coal passers, $50; oilers and water tenders, $65; boatswains, $70; carpenters, $75. Overtime pay for cargo work will be figured at 50 cents an hour and for ship work at 40 cents. A 50 per cent bonus will be paid to crews entering the war zone, and employers will pay seamen $100 each compensation for loss of personal effects when ships are sunk.

The scale of wages and bonus for steward and cook will remain unchanged for the present.

To increase the number of men available for work every ship will carry a certain number of boys. The number of able-bodied seamen will be reduced by increasing the number of ordinary seamen in the crews.

It was agreed that bonus and other conditions arising through the war should terminate with the war, but that the wage scale should remain in force for a year thereafter.

Employers and seamen will unite in an appeal to be sent to men who have left the sea asking them to return to service.

The Provost Marshal General's office will be requested to exempt seamen from military service on the grounds that the scarcity of sailors makes the services of those who follow the sea as valuable as those of the men who carry guns.—*N. Y. Times*, 11/8.

COMMANDEERING VESSELS.—Commandeering of American tonnage now on the seas will be begun by the Shipping Board as soon as an operating department can be organized and a practical shipping man can be found to head it. The board has the names of several men under consideration and probably will make an announcement within a few days.

The board deems it unwise, it was said, to take over for operation any ships until a definite plan is formed and until it has an organization to handle the vessels. Two plans are before the board. One calls for government operation of all ships requisitioned and the other for a system of commandeering charters. Under the latter plan the vessels would be turned back to their owners for operation under direction of the board's operating department.

The present intention is to form the new department under the fleet corporation, its directing members to be Rear Admiral Capps, manager of the fleet corporation, and two or more members of the shipping board. The subject of an international control of tonnage and rates was discussed by the board with Connop Guthrie, of the British mission. The board will also see Thomas Royden, another member of the mission. The conference also dealt with the question of requiring ships to fill their cargo space to conserve tonnage.—*Washington Post*, 10/8.

RECRUITING FOR THE UNITED STATES EMERGENCY FLEET.—The United States Shipping Board's recruiting service has issued a statement giving the minimum experience required of seafaring men who wish to enter any of the various grades for deck officers or engineers in the new United States Emergency Fleet.

This information is based on the revised rules of the steamboat-inspection service, recently issued at Washington. These rules have been considerably modified to make admission to the merchant marine service easier for real sailors who hitherto may not have had the opportunity to secure licenses as officers.

While intended primarily for the information of applicants for admission to the free schools in navigation and engineering which the Shipping Board is establishing in the coast and Great Lakes states, the summary of the new rules is of general interest to American sailors everywhere.

Under them, for example, the master of a fishing or coasting schooner, of two years' standing, becomes qualified to become chief mate of one of the new cargo steamers being built for the Shipping Board. The modified rules also qualify the master of a sound, bay or lake steamer, with a proper knowledge of navigation, as chief mate of an ocean steamer.

The rules thus let down the bars to many men who previously could not easily enter the merchant marine service, while guaranteeing that the men thus admitted shall be experienced in their calling.

The Shipping Board will take in hand any applicant with proper sea experience and give him the necessary free training in navigation to qualify him for his new position, at any one of its 30 free navigation schools.

The minimum qualifications, under the new rules, for entering a school for navigating officers are as follows:

At least two years' experience in the deck department of ocean or coastwise steam vessels.

At least three years' experience in the deck department of ocean or coastwise sailing vessels.

At least three years' experience in the deck department of sailing vessels engaged in the ocean or coastwise fisheries.

At least one year's experience as mate of steam vessels engaged in the ocean or coastwise fisheries.

Two years' experience as master or chief mate of ocean or coastwise sailing vessels of 200 gross tons or over.

Two years' experience as master or pilot of lake, bay, or sound steam vessels.

A graduate from the seamanship class of a nautical school ship.

The minimum qualifications for entering the engineering schools are:

At least two years' experience as oiler or water tender, or combined experience of two years in these positions on ocean or coastwise steam vessels.

A graduate from the engineering class of a nautical school ship.

A graduate in mechanical engineering from a duly recognized school of technology, with three months' sea experience.

A stationary engineer in full charge of a 1000-horsepower plant.

A locomotive engineer who has had six months' experience in the engine department of ocean or coastwise steam vessels.

A journeyman machinist who has been engaged in the construction or repair of marine steam engines.

An apprentice to the machinists' trade who has been six months on a steam vessel.

Engineers of lake, bay, sound, or river steamers.

At least three years as fireman of ocean or coastwise steam vessels.

Only American citizens are admitted to the schools. At the end of the school service the student is to be given sea training on pay. There is no enlistment, as in the navy, but if accepted for training an applicant is expected to sign for the merchant marine, where wages at present are attractively high.

Applications for places in the merchant marine service are being received at the rate of several hundred daily by Henry Howard, Director of Recruiting for the United States Shipping Board, Boston, Mass.—*Shipping Illustrated*, 21/7.

OUR SHIPPING POLICY SECRET.—This government has a definite plan for meeting the shipping needs of our Allies, but the details are being kept secret. It was disclosed July 20 that one of the very first steps is the taking of an inventory of the world's present and prospective tonnage available for allied uses.

The Japanese Government has been requested by the United States to furnish it with exact figures revealing the amount of Japanese tonnage constructed and of the amount building, together with the approximate dates when the vessels under construction will be completed. Similar information furnished by Great Britain and France respecting the tonnage of those countries and statistics revealing Norway's shipping resources are said to be in the hands of this government.

Japan has promised to furnish the figures. It was predicted July 20 that they would be considerably larger than has been supposed. Every shipbuilding plant in Japan has been working overtime for more than a year, and new yards have been established.

The Tokio Government already has inquired the attitude of the United States toward the exportation of steel from this country to Japan, and has received a favorable answer. This government says it considers Japan as one of its associates in the world war, and Japan will be specially favored, as are the European Allies. Japan, it is pointed out, is very largely dependent upon the United States for steel, and should her supply from this country be abridged it would seriously affect her merchant shipbuilding program.

Diminution of Japan's steel and iron imports would also have a baneful effect on Russia, it was asserted, as Japan is the principal supplier of munitions to Russia, and if confronted by a situation in which it would be necessary to sacrifice either munitions or ships, munitions in all likelihood would be sacrificed. But the United States has determined that no such situation shall arise, and Japan is assured that her steel purchases will not be jeopardized.

It is believed that Japan will benefit from the agreement entered into by the Government and the steel interests, whereby the Allies will obtain steel at the same price that the United States pays.—*N. Y. Times,* 21/7.

THE PACIFIC MAIL.—The Pacific Mail Steamship Company announces, through its vice-president and general manager, John H. Rosseter, that a regular fast freight and passenger service has been established between San Francisco, Honolulu, Manila, Singapore, Calcutta, and Colombo. This service was inaugurated by the sailing on August 6 from San Francisco of the steamship *Santa Cruz,* carrying both passengers and freight. The *Santa Cruz* will be followed by the steamship *Colusa,* which will sail on October 6. The company states that great interest has been evinced in the service, and it feels confident that it will be a great success.—*The Nautical Gazette,* 9/8.

PERSONNEL

NAVAL PROMOTIONS.—The *New York Herald* commenting editorially upon the work of the "Board of Rear Admirals" said:

For the second year naval promotions by the process of "selection up" have been announced, the list of officers recommended by the board of nine rear admirals having, without any changes in the advancements recommended, been approved by the President and the Secretary of the Navy. In any system of promotions outside of that fatal one by seniority surprises are certain to be excited, but now, and as it was last year, the surprise is not so much with the names of those proposed as with those passed over.

The duty imposed on the board is a serious one. To choose out of a service where the standing—mental, moral, professional and physical—of its officers is admittedly of the highest must in its perfection be possible only to the archangels, the seraphim and the cherubim combined. The best that may be secured is therefore limited by human possibilities, expressed in good intentions, absolute honesty and by a determination to act so that the efficiency of the navy is the final aim. It is certain that these senior officers have brought to their solution of the problem these human qualities in an eminent degree.

An unusual number of advancements had to be provided for this year by the supplementary act of May authorizing temporary appointments for the period of the war. These with the permanent appointments ordered under the general law reached a total of 100. Taking in both cases the highest and lowest limits within which the selections were made, the claims of no fewer than 216 officers must have been considered. This means, apparently, that more than one-half have been passed over until another year. Here, then, is one system on trial. What and where is a better one, or how can this be improved?—*N. Y. Herald,* 16/8.

The following is a summary of the promotions by selection:

To Rear Admiral		*To Captain*		*To Commander*	
Permanent	2	Permanent	8	Permanent	20
Temporary	5	Temporary	20	Temporary	46

TRAINING CAMP AT GREAT LAKES.—The largest naval training camp in the world is under the process of construction at the Great Lakes Naval

Training Stations at Great Lakes, Ill. Ten thousand men will be accommodated by the camps in addition to the complement already under training at the station proper.

The work of constructing buildings to house the men who will be under training is being rushed to completion by September 15. It is said to be the greatest civilian work ever undertaken by military or naval bodies.

The site embraces an area of 1000 feet by a mile and is divided into five camps—Dewey, Farragut, Ross, Perry, and Decatur. Each regimental unit will be a complete training station in itself, with its own barracks, mess hall, storehouse, dispensary, isolation building, officers' quarters, executive offices, drill hall, brig, and training grounds.

There are 127 new buildings to be erected in all. Each barrack is built of steel and wood with double floors and is constructed in the form of the letter "H," a latrine, represented by the neck of the "H," joining the barracks. Shower baths are included in all latrines.

Each half company holds mess in its own barracks and cares for its own mess gear. From a sanitary standpoint the camps are pronounced 100 per cent perfect.

Work was started July 3, and at the present time 2500 carpenters, mechanics, and laborers are employed in rushing the work to completion. —*Army and Navy Register*, 4/8.

CAFETERIA SYSTEM IN THE FLEET.—The commander-in-chief of the Atlantic fleet has announced that the system of food carriers adopted on board the U. S. S. *Michigan* is approved for installation as far as practicable on all ships where the cafeteria system has not been installed. This is the result of a recent inspection by the fleet paymaster of the messing system on board the *Michigan*. It took about 15 minutes to load all the food carriers with the full dinner, except bread, coffee, butter, etc., and it took a little less than 3 minutes for the messmen to pass through the galley, each man taking two food carriers containing dinners for two mess tables of 10 men each. The system is very practical and is considered a very great improvement over the system ordinarily in use. It is very simple in its administrative features, being considerably less complicated than the cafeteria system as established on board the U. S. S. *New York*. The *Michigan* plan requires less supervision and following up than does the cafeteria system and is believed to be more practical for general use. Vessels of the newer types are well adapted for the cafeteria system, and on these vessels the decision as to which system shall be installed will rest with the commanding officer.—*Army and Navy Register*, 4/8.

SUBMARINES

THE SUBMARINE PROBLEM.—That the U-boat hunt should at all be conducted from the skies is indeed an anomaly; yet on numerous occasions it has been demonstrated that submarine craft are more susceptible to aerial methods than to surface and sub-surface craft and devices. This does not imply that aircraft are the sole solution of the problem; far from it, aircraft are but a means to an end. Alone, they would not suffice. But in combination with the other methods already in use they complete the anti-submarine campaign—round it out, as it were.

Aircraft can and are participating in the two main phases of the anti-submarine campaign: the detection of the U-boats and their destruction. As a general thing, however, the aeronautical activities are limited to the former phase, since the latter can best be accomplished by the usual surface and sub-surface means, despite the fact that there are not a few instances in the present war of the destruction of submarines by means of aerial bombs.

Exceptional visibility is the main reason for the use of aircraft in the present campaign against the German sub-sea blockaders. Although peri-

scopes can be sighted from a position near the surface with considerable difficulty, owing to their small size and clever camouflage, as well as the refraction of light from the surface, at a height of several hundred feet they stand out more or less prominently against the mass of water. Usually it is the foam in the wake of the submarine's periscope that betrays its position to the airmen, and the best time for aerial patrols is therefore limited to clear weather and calm seas. During stormy weather it is difficult, if not impossible, for an observer to detect a periscope because of the broken water on the surface. However, this drawback is more or less counterbalanced by the fact that rough weather is not favorable to submarine operation. The sighting range naturally increases with the altitude of the observer; but the altitude, in turn, is limited by the sharpness of vision of the observer. Special optical instruments are used to some extent to improve the vision of the airmen at great heights, and these instruments are especially suited to seeing objects under water.

Aside from the wide range of vision, the observer in the skies is able to see for some distance below the surface of the water under favorable conditions. But too much faith has been placed in this fact by the laity, and too much is expected of this possibility of aerial observation. True, in clear weather an aviator, from an altitude of 1000 to 3000 feet, can make out the general shape of a submarine down to a depth of 100 feet. This is the extreme range of vision—under *ideal* conditions. In stormy and cloudy weather the vision is reduced to 20 or 30 feet below the surface, and under still more adverse conditions the vision is limited to the surface. Upon the condition of the surface, the nature of the ocean bottom, and the condition of the skies depends the range of vision through water. In the North Sea, where the water is a kind of leaden gray in color, vision through the water is almost impossible and 10 feet of water over the periscope is sufficient effectively to hide the U-boat. So in the long run the aerial observer must rely on the foamy wake of the periscope and superstructure of the U-boat, nothing else.

Kites, captive balloons, seaplanes and small dirigibles can and are being used to good advantage in the U-boat hunt. The seaplanes can be either of the fast, scout type, or the heavier reconnaissance and bombing type. Although the seaplane is somewhat handicapped by the fact that it cannot stop in the air and hover over a given spot, it has the advantages of high speed and climbing ability, which make it ideal for covering the immense areas over which the submarine hunt takes place. Furthermore, while the majority of U-boats are ill-equipped to combat troublesome aircraft, those that are equipped with anti-aircraft artillery, particularly machine guns, stand small chance of hitting the fast-moving seaplane, especially since the submarine deck is anything but a steady gun platform.

A speedy seaplane can cover a remarkably big area during a single trip, and at a height of 7000 or 8000 feet its observer is able to command a view for miles around while the craft is difficult to see by those below. Indeed, while it is well known that an aeroplane can be heard for some distance off on land, on water the lapping of the waves and the whistling of the wind through the rigging and superstructure of a vessel make it almost impossible to hear the power plant of an approaching seaplane until it is almost overhead. Hence the submarine plying the surface has slight warning of an impending seaplane attack until it is often too late to escape.

Of late the Allies have resorted to the use of small dirigibles, which are known as "submarine scouts" or "Blimps" by the British. These diminutive dirigibles are really a cross between the aeroplane and the dirigible, being provided with a small gas bag and an aeroplane body and power plant. Although slower in speed than the usual seaplane, these dirigibles have proved excellent in coast patrol work. They have a cruising radius of several hundred miles, and are equipped with bomb-dropping devices and wireless apparatus. The main advantage of the dirigible, in this instance, is that it can sail through the air at any desired speed within

its range, and stop and hover over any suspicious spot to await the reappearance of its submerged prey. The seaplane, in contradistinction, must continue to fly at a high rate of speed, and the best it can do is to fly in circles or figure eights about a given spot.

Captive balloons are used to a large extent in harbor protection; in fact, most of the French ports are provided with captive balloons in which observers scan the sea for miles around in their watch for lurking U-boats, as well as hidden mines. In the latter connection it is well to add that the seaplanes and dirigibles also perform the function of indicating mines and other dangers to mine sweepers, and in this way greatly enhance the value of their services. Kites, it appears, have not been used to any appreciable extent, although they have been recommended for use on merchant ships and even war vessels as a means of elevating an observer several hundred feet into the air, instead of placing him in the usual crow's nest where the visibility for submarine detection is rather limited.

Aircraft are used more in the rôle of detectors than destroyers. Although many of them, particularly the heavier seaplanes and the dirigibles, are equipped with bombing apparatus and light guns, the inaccuracy of the former and the light caliber of the latter have somewhat limited the powers of aircraft as offensive weapons against U-boats. Nevertheless, it is understood that many excellent types of submarine bombs and grenades have been introduced, and whenever a seaplane or dirigible has been able to approach to within a few hundred feet of an underwater raider the results have been extremely unfortunate for the latter. Some of the missiles employed are designed to penetrate some distance down before exploding under water, so that even if a direct hit is not scored the force of the explosion reaches the submarine in sufficient degree to make it most unpleasant for the crew, let alone impairing or disarranging part of the equipment.

But the main function of aircraft is to co-operate with the usual surface craft, signaling to them by means of wireless, smoke bombs or rockets whenever an enemy is detected. The surface craft, in turn, have usually little trouble in following the enemy with the aid of the aerial observer; and if the chase is continued long enough the result is generally one less submarine to contend with. In convoying vessels, aircraft are almost indispensable if the greatest degree of safety is sought; for the aerial observers are able to detect U-boats long before they would be seen by those below.

It has been suggested, and it is rumored that the plan has already been carried out in a modest way, to maintain an aerial patrol along the routes followed by shipping, the seaplanes and dirigibles taking their supplies of bombs and fuel from mother ships of the class officially known as "seaplane carriers." With hundreds of aircraft constantly in the air and covering a wide expanse of water while co-operating with the usual surface craft, it should be possible to make it extremely dangerous for any U-boat to show itself above the surface during daylight; and at night large seaplanes equipped with searchlights could make it almost as dangerous for submarines to rest on the surface while charging their batteries. An English authority has suggested that one seaplane carrier with half a dozen seaplanes, carrying bombs and perhaps light armament, should be capable of acting as convoy for a flotilla of half a dozen ocean-going tramp steamers through the submarine zone.

Were it not for the increased thickness of the armor carried by German submarines, a lightweight cannon of 1½ or even 3-inch caliber could be used to good effect, but at the present stage of the campaign such artillery would prove of little value against the latest U-boats. At any rate, the fear of bombs is sufficient to make a U-boat stay under cover and use its limited store of torpedoes against intended victims.

All in all, aircraft can be considered as valuable accessories in the present U-boat hunt, and it is possible that improved bombs may yet make them major weapons.—*Scientific American*, 21/7.

DARING RAID BY BRITISH SUBMARINE.*—The following article and editorial appeared in the *Washington Post*, July 29:

EDITORIAL NOTE.—The author of this series of four articles is a young American, who has spent most of his time since the war started with the British patrol fleet, taking an important part in helping to organize that branch of the service known as the Sea Slugs.

He has accumulated a remarkable collection of anecdotes, incident to this exciting branch of the service, and many of these were presonal adventures in which he took part, and which make one of the stirring narratives to come out of the war. He recently returned to the United States to assist the American Navy in organizing the same branch of the service, and should be of great value because of his experience abroad. So far as known, he is the only American to serve with the British patrol. Of course some of his experiences, of military value to the enemy, cannot be related. At the request of the service, publication of his name is withheld.

Often I have been asked: "Why don't the British or French submarines do something? Why can't they be as effective as the German U-boats?" I am going to relate a story of a submarine belonging to one of the allied powers to show you that they are effective. The names will all have to be fictitious. I cannot even tell you on the fringes of what sea the port was located. I will tell it to you as nearly in the words of the narrator as I can remember it.

The reason we do not hear more about the exploits of the Allies' submarines is that they operate against war craft. Their achievements are of military importance, and the allied governments are not ready to make them public. The German U-boats operate almost exclusively against merchantmen. It is a different proposition.

We will call this submarine commander Lieutenant Ripley, because that is the furthest from his real name that I can conceive.

Here is his story.

The division commander had sent for me. As I entered his room he regarded me with envy.

"He must be going to make me a vice admiral," I thought to myself, "to look at me as jealously as that."

But I couldn't see why I should be made anything higher than what I was, a lieutenant, senior grade, for the only thing I had done since the war started was to go over cylinder heads daily, test dynamos and see that every single screw and rivet of my little craft was tight as a drum.

"Mr. Ripley," the division commander was speaking. "Mr. Ripley, the air scouts have reported two cruisers and a second-class battleship in the harbor of Q, not more than a mile inside the outer defences of the port. You will take the *E-14* (which is not the name of the real submarine) and destroy those vessels."

Simple and direct orders—not to be misunderstood. I saluted very calmly—I think.

"Very well, sir," I said, and turned to go.

At the door, the division commander called to me.

"Ripley, you're a damned lucky dog!" he declared in splendidly unofficial and informal language.

As soon as I was out of sight of the orderly outside the commander's door, I broke into a run. I could scarcely keep from shouting.

While I was running down the wharf, I called to the signal officer to wigwag for the men at the "guardo," and, once alongside my beautiful little craft, I shouted the order to unmoor.

The men must have seen my excitement. They were a snappy crew at all times, but, on this occasion, even before I had time to get impatient, everything was reported ready below. The engine telegraph responded

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satisfactorily to the necessary tests, and, almost simultaneously with the trial squawk of the air whistle, the men from the "guardo" arrived.

The bow line was cast off, and, as the motors began to turn over I glanced, half scared, astern. A dozen times I had started out under orders only to be called back almost before the hawsers were cast loose.

"Hawkins," I said to the helmsman, "you keep a sharp lookout ahead. Never mind what's astern of us. We don't want to ram one of those blanked sea slugs."

"Aye, aye, sir," said Hawkins with an insubordinate wink. He knew what I meant. I was afraid they would signal us back, and I was determined not to see that signal.

I began to size up the situation in my mind. It was no amateur's task that we had before us. Three warships were to be destroyed inside the enemy's harbor defences. I knew those harbor defences. Our intelligence department had furnished us with maps of them. They were not impregnable, but they were dangerous, if we should have to come to the surface for any reason whatever. I had heard that the German submarines had buzz saw wheels at the prow to cut through chain nets. I can say nothing about our equipment of to-day—but, at the time of which I am telling you we did not have them.

I figured that the *E-14* had air and provisions for a week. There was oil fuel enough for 350 miles at the surface and juice enough stored in our batteries for a run submerged of—well we had better not say how long we can run submerged.

It was just 10 o'clock in the morning as we slid out of the harbor. We were turning our tail on our own fleet for a run, mostly through hostile waters, of almost 200 miles. We were in almost as great danger from our own pesky submarine chasers as from the enemy. I set my revolutions for 12 knots running on the surface. There would be no sunrise until 4 o'clock the next morning, and later if cloudy, so I counted on a couple of hours leeway to make our attack as soon as it was light.

When we were well at sea I informed my sub, Harvey, what the game was. He couldn't help letting out a whoop. I turned the craft over to him and went below to tell the other men. You never heard such a yelling as broke loose among the crew when I announced our mission. There was no need to caution the men. I knew every one of them, and they were aware of what was expected of them. A warm bearing on this voyage would have meant disgrace forever for the oiler that let it heat up.

We struck straight out to sea for several miles to run less chance of hitting one of our own mines. Just at dusk Harvey reported an aeroplane to leeward. Through the binoculars I could make it out—small as a vulture that specks the sky a few seconds after an animal has been slain.

I hated to use up the juice that might be so valuable later on, but there was no use risking discovery at this early stage so I dove to about 10 fathoms and ran along at 8 knots for more than an hour to be sure of darkness when I came up. The gyroscopic compass enabled us to hold our course as accurately as though we were at the surface.

Once, the man on watch at the bell receiver reported the sound of a ship's propellers directly above. I gave over the wheel to Harvey and listened myself. Sure enough, there was a vessel over us and not very far away. I blew the main ballast tank enough to stick the periscope out of water and had a look around.

There was a 10,000-ton cruiser, as nice a target as you would want, if she had been an enemy. It was after colors, but I knew from the silhouette book that she was one of our own. Her lookout evidently did not see us.

When I was far enough away to dive before she could have hurt us I fired the private signal for that night. She replied correctly, and, secure in the knowledge that she was a friend I proceeded on the surface.

I was praying for rain, or at least gray weather, and it looked as if we would get it. I made all the men who could be spared off watch get what

sleep they could, and, about 2 o'clock in the morning we were off Q harbor.

I didn't dare try to run in because all the lights along the enemy's coast had probably been extinguished or misplaced to destroy the value of before-the-war charts. We stood off and on near the coast line, charging up our batteries and waiting for enough light to lay our course.

The mouth of the harbor was two miles wide, so I had little fear of effective artificial obstructions, but there was a bar across the entrance over which the old chart showed only 6½ fathoms of water. The *E-14* from the top of her periscope to the bottom of her keel was 20 feet, which left us only 19 feet to spare.

This seems like a lot, but there was great danger in such shallow water of being dragged down by suction and striking the hard shell and gravel bottom, which the chart showed, so forcibly as to rebound and come out on the surface and be picked up by the enemy.

Well, there was one lucky thing. There were no rocks shown on the chart.

It seemed as if daylight would never come. At last, about 8 bells in the morning the sky grayed and I made out two huge masses—forts—at each side of the harbor entrance. We lay not more than a mile inside an island which, according to my chart, was about 2 miles beyond the forts. I had to get under way quickly, fearing the forts or one of the harbor patrols might sight us.

Before we dived I straightened out our course by the compass, submerged to 10 fathoms and ran as slowly as was consistent with good handling, about 4 knots. The tide was high so, at least, we would get the best benefit of what depth there was.

When I calculated we were near the bar, I rose till the manometer showed only 10 feet of water over us—10 feet to hide us from the sharp-eyed lookouts at the forts or any aeroplanes which might be up.

Suddenly, there is a jar. Two or three of us are thrown from our feet. I feel the too-familiar sensation of sucking bottom and know that we are being drawn down to the bar. As he has been instructed previously, the diving rudder man gives her the up rudder, and I crowd on full speed ahead.

It means our periscopes probably will stick out of the water and the forts will see us and open fire. Still, it is a case of taking our chances with that or be sucked down into the sandy bottom and lose all hopes of bagging the three ships we are out to destroy.

I get one quick look through the periscope, but I can't make out anything worth while. Down we go again. Not a shot has been fired, but it is certain the lookouts at the forts must have seen us. It's got to be quick work now. The next time we split the surface there will be tons of high explosives and leaden slugs churning the water around us.

The engines throb and wrack. We are making top speed, submerged. There is a mile to go before we will be where the men-of-war are reported lying. Will they be moved after the alarm from the forts? If they are, we are worse than destroyed. We have failed on the job. Our torpedoes are in the tubes. Six big, 18-inch superheaters ready for their last run. It only remains to come up, sight the enemy, and let drive.

We porpoise again. My eyes are glued to the periscope. There on our port side, only 100 yards ahead, lies a big gray cruiser, stern to, alongside a wharf, coaling. Midstream to our starboard lies an old light cruiser, and 800 yards up the basin, between the two, is the older type of battleship.

The flat country roundabout is veiled in mist, and there is a drizzly rain. The sea is choppy, which adds to our chances. I drive straight for the starboard side of the larger cruiser. I have picked a point just forward of amidships and I am going to fire at about 300 yards.

It seems almost impossible that they have not picked us up yet. I can see officers on the quarterdeck of the cruiser reading the signals at the

fort. I can imagine how the gunboats and destroyers are rushing for the entrance of the harbor, but we are inside now. Getting out is another matter and not of so much importance.

My hand on the toggle of the firing valve is shaking. Thank heaven, I do not have to depend upon it to aim.

A seaman on the forecastle of the warship has seen us. I see him wave his hat and run toward an officer. My distance scale reads 349 yards. The cross wires of the periscope are on the middle funnel of the cruiser. We have a chance to get one of them anyway.

With a muttered prayer, I jerk the firing valve of No. 1 torpedo tube. There is a hiss of air and a rush of water. It tells me that the missile is fairly launched.

Down we go without waiting to see what happens, the helm is hard a-starboard, and we are driving for midchannel, where the old light cruiser lies at anchor, stern to, nosing the strong ebb tide. The men are jubilant. They insist they heard the roar of an explosion that means the warship is blow up. I have been too busy thinking of the next victim to pay any more attention to the first. The torpedo could hardly have failed to reach home, though, at that range.

Across the harbor at an angle we plow, aiming to come up to starboard of the cruiser. They will probably expect us on the quarter toward the ship we have just struck, so we may fool them, and, at the same time, have the second victim screen us from the battleship.

I cast loose a dummy periscope. That may deceive them into thinking we actually are attacking on the port side of our second victim. I can hear the muffled roar of the guns as they open on the decoy. I laugh, but there is no mirth in the sound. It frightens me. It is no time to laugh when men are dying above you, because you have just pulled a lever, and you are on the very point of sending hundreds more to their destruction.

But it is war and a rotten war at best.

Another porpoise. We are almost 500 yards to starboard of the older cruiser. I swerve and run straight for her bows. They are so busy firing at the dummy periscope with the port guns that they have not gotten their starboard batteries into action when I launch No. 2 torpedo, and we are near the bottom again. This time I hear the explosion. A long drawn-out roar that vibrates our craft. It means her magazine must have gone up, too.

My men are all very cool. So am I. When you are down 60 feet or so beneath the sights and sounds of battle, they are neither grewsome nor exciting. I suppose I should be thinking with pity of the dying and mangled above us, but I cannot. It is a rotten war, and the Boches have made it rottener.

It seems impossible that our luck should hold. We have bagged two out of three. If we can sink the third vessel we will have made a record. I will have to take a chance at a longer range this time or we will never get out through the wreckage. Our few lives against those we have sent to their Maker are of no importance, but we cannot waste a submarine. We must go back with her.

Now we have the range. My hand is on the toggle valve, very steady this time. My nerves are dead. I am hardened at it now. The battleship is lowering her boats to assist the men in the water. I begin to pull. There is a terrific crash. The *E-14* goes staggering toward the bottom. I slide across the deck and land with a sickening thump against the steel side.

The next thing I know Harvey is leaning over me, and I hear the hiss of air through the vent of the manifold. Hawkins is letting water into our ballast tanks to keep us down. I go over to him unsteadily.

"They got our periscopes, I think," he said. "But the torpedo went just the same, and we hit her, too." This is all he is thinking of. The fact that we probably have seen our last glint of sunlight on blue water is not worrying him at all.

I learned later that while I was running up on the last cruiser two destroyers had sighted us from astern and had fired just as I was about to launch the torpedo. The ship I fired at was injured although she was not struck as badly as the others.

We lay on the bottom, 60 feet down, while I took account of casualties. One of the men had an ugly gash across his forehead from being thrown against a stanchion, and another had a broken nose.

We were blind. We had to steer by the compass, and we had to run as fast as we could, for the enemy would probably try to drop depth bombs and artificial barriers.

We were making our top speed submerged and taking chances. Suddenly, when we must have been at least 500 yards from the sand bar, where I would, of course, have slowed up, there was a violent jar, the grinding of steel, our motors went dead and there was a rush of water from the battery compartment into the living quarters.

Quick as a flash we dogged down the doors of the battery room to keep the water there, but we were in a bad way. I do not know, but I suppose iron girders or other obstructions had been lowered since we entered the harbor.

Whatever was the cause, the deadliest enemy of the submarine was fighting against us. The salt water on the sulphuric acid of the batteries was generating chlorine gas. I felt it gripping my throat. I wanted to tear at it with my fingers. Hawkins was coughing and Harvey's face was turning a whitish purple hue.

Fifteen minutes there below the water and it would all be over, but what a 15 minutes it would be. Those few seconds would stretch out into an eternity of torture. Our lungs and the lining of our throats and noses would be literally eaten away. Any sort of death would be better than this.

No porpoising this time. We are going up to stay up until a shell sends us back to the bottom once and for all. We are up well awash now. The surface motors are thrumming away. I open the hatches and start the electric fans to blow the chlorine out.

Astern I can see the top masts of two of our victims just sticking out of the water. The third has a bad list. But the forts are awake now. They are getting the range. One big shell plops into the water almost alongside us and a mountain of sea almost knocks me out of the conning-tower.

Here comes another. I can tell instinctively that it is coming my way and I duck. It drops harmlessly into the water 40 feet ahead of us.

"Don't dodge," says one of my men. "You never see the one that gets you."

Hawkins is clinging to the wheel, head down between his shoulders, as though to ward off a boxer's blows, holding her right to her course. He could cut a cork. We are half way across the bar. If they don't get us it will be a miracle. They are excited, I suppose, and, of course, we don't present a very big target.

The men have thrown the batteries overboard. If ever we can get into deep water again we can go to the bottom without fear of stifling. Just 100 yards ahead, there will be deep water. Chasing us are two destroyers. The guns are getting the range. The destroyers are racing along as though we were standing still.

I slam down the hatch. Down, down, we go. There are 111 feet of water over us now. They can bang away all they like. Even the aeroplanes won't see us at that depth. I suppose they are dragging for us with anchors and using depth bombs and other ingenious and pleasant devices, but we are pretty deep.

All that day we lay there on the bottom and slept the best we could. That night we rose cautiously and laid our course for home. If the

enemy had known we had lost our batteries they would almost certainly have gotten us, but, as it was, they probably dragged the bottom miles from the point where we went down.

There isn't anything more to tell. We ran all night, afraid one of our own sea slugs might pick us up and finish us, but good luck was with us, and we encountered a gunboat first. She recognized our signals and convoyed us into port.

We were a pretty worn out crew, I can tell you, but we were lucky to be back alive and more lucky to have gotten away with what we did.

LESSONS OF THE WAR

SUBMARINE CHASERS.—The submarine chasers now in use in European waters have fallen short of expectations. For one thing, they consume so much gasoline that in the Mediterranean, for instance, their radius of action is so small as to give the submarines a tremendous advantage. It is, therefore, not surprising to hear that the Navy Department has decided not to place additional orders for chasers when the 110-foot boats now building are completed. Instead, the building of large destroyers is to be pushed to the utmost. It formerly took two years to build destroyers, but by eliminating refinements and working three shifts a day, they could be built almost as quickly as the large type of chasers. According to a report from Washington, said to be well authenticated, the immediate reason why the 110-foot boat is being abandoned is that the design in accordance with which it was built proved impracticable. The first chaser received its trial trip recently. It is reported that it drew considerably more water than it was supposed to draw, that its speed fell short of expectations, being not much more than enough to enable it to get out of the way of a submarine, and that its deck was not strong enough to stand the firing of the gun mounted upon it. It is understood that the defects in the boats can be partly corrected, so that those which have been built or which are on the way toward completion can be made of some service in submarine patrolling, but the type at its best was not promising enough to continue building. The history of the adoption of this boat has not been disclosed. When it was proposed to build chasers the naval representatives of the Allies in this country were consulted. The English had had experience with chasers running in size from 85 feet up, and unqualifiedly condemned the small boats. They advised against building the 110-foot boat as not big enough to stand North Sea weather, not possessing enough radius of action and not having decks high enough above water for the effective use of guns. The French, however, were anxious to see something built, and built quickly, and after some hesitation they approved the 110-foot boats. The administration probably was influenced by somewhat the same considerations as the French. The 110-footers could be constructed much more quickly than the larger boats the English advised. They could also be built in greater numbers and the desire to have "several hundred" chasers by the beginning of 1917 was keen. Accordingly the 110-footers were adopted.—*Shipping Illustrated*, 11/8.

SHIPMASTERS AND THEIR INSTRUCTIONS.—Queer tales are being circulated about the haunts of seafarers these days, one of the most frequently heard yarns being that a certain ship escaped destruction by a submarine because her master departed from the course laid in the confidential instructions for the use of ships navigating the danger zone. For the sake of the good sense of shipmasters in general, it is to be hoped that such yarns are only concocted with the view to produce an effect among listeners, because it is scarcely credible that a man in his right mind would deliberately override instructions which are based upon conditions

of which he can have no knowledge. It seems that there is ample warrant for underwriters to issue a warning to owners that in case of a vessel having met with disaster at the hands of a submarine through failure of the master to comply with official instructions for the navigation of that area, no claim for loss will be entertained under the war risk policy. A shipmaster who disobeys instructions is not only guilty of jeopardizing his vessel at a time when every bottom is an item of national defence, but he also imperils the lives of those on board who naturally look to him for their personal safety. Perhaps a word from owners to masters will be enough to repress this pernicious practice, unless, as stated, there is more silly bragging than truth about these yarns of the sea.—*Shipping Illustrated*, 4/8.

GERMAN SUBMARINE ACTIVITIES.—While it is not possible to arrive at anything very definite in regard to the actual destruction wrought by the submarine warfare of the enemy, it is the view of conservative officers that the results are not overwhelming; certainly they are not anywhere near the realization of the expectations and purposes of the Germans. The British, French and Italians appear to be nearly self-supporting in the matter of tonnage for food, while England is steadily increasing the number of its ships and, of course, there is the coming American contribution to the transatlantic carriers. With the prospect that the present Anglo-French drive in Flanders will cripple German submarine resources, there is hope that the situation in this particular is improving. There will be no relaxation of the vigilance in any quarter, least of all in American waters, where it is predicted that the German submarines may shortly appear not with any expectation of achieving anything of military advantage so much as to produce an effect on the people of Germany, although such a movement is justified by some observers as a skillful German plot to compel the return to this country of our destroyers or of the Atlantic fleet if that command shall go abroad. It is expected that a German raid on our coasts by submarines or the appearance of German aircraft in this country would produce something like panic here and would lead to a public clamor for protection in the form of a return to home waters of any of our fighting ships that may be abroad. If there is the least probability of any such public demand, it would be well for the Washington authorities to sound a note of warning that we may expect anything, no matter how weird and futile and even foolhardy, from the enemy if it shall have the desired effect upon the Germans at home or if it shall produce such alarm in this country as would find its outlet in an insistence upon the return of our naval forces for the purpose of home defence. The people of this country must, of course, school themselves to the destruction, disasters and casualties that are sure to ensue with the progress of the war and to refrain from interference with any plans of the War and Navy Departments, which can be counted upon to do the right and sufficient thing with a full knowledge of relative necessities, existing and prospective.—*Army and Navy Register*, 4/8.

CENSORSHIP.—A strict military censorship is as necessary to the successful prosecution of war as is the raising of armies, the production of war material and the creation of a general staff. Censorship and the freedom of the press will always be at loggerheads—the censor tending to cut down to the lowest limit the sum total of information that may be made public, and the editor striving, as is his wont, to fill his columns with the largest possible amount of war news.

The point of view of each of these gentlemen is essentially different. The censor looks at the question purely from its military and political side, the editor, however much alive he may be to military and political considerations, is tempted to judge all information that comes to his desk by the test of its "news value."

Now, we are of the decided opinion that for the successful prosecution of this war upon which we have entered, the military and not the editorial mind should have the first and last say as to what may and what may not be published. For the government alone knows all the facts of the case, and therefore alone is qualified to decide what information should be given out to the public.

The publication of a certain fact may appear to the lay mind to be perfectly harmless, whereas to the mind of the censor, because of certain collateral facts which he alone knows, such publication would be fraught with very great danger. A case in point was the announcement in the daily press of the arrival of the first contingent of American troops in France, at a time when the second contingent was still several days' steaming from port. The safe arrival of the troops seemed naturally to preclude all need for further secrecy; but to the censor, who knew that several transports with their priceless freight were still out on the Atlantic, such publication was a notification to the U-boats that a large and valuable part of their quarry was abroad in the danger zone.

There is but one attitude for the press of this country to assume, and that is one of loyal acceptance of the inconveniences and restrictions of a military censorship. This is one of the burdens and sacrifices of war. Let us endure it cheerfully. Above all, let us not add to the distractions and worries of our government by adopting an attitude of constant and carping criticism.—*Scientific American*, 28/7.

NEW VOLUNTARY CENSORSHIP RULES.—A new list of press regulations making material changes in the voluntary censorship rules under which American newspapers have been operating was promulgated July 30 by the Committee on Public Information.

The new regulations contain the first general request that there be no published mention of the arrival of American troops at European ports, replacing in that respect an express authorization in the old rules for use of any cable dispatches passed by the European censors.

Other sections of the old regulations are made more severe by specific stipulations in place of the more general language employed in the rules in force until now. Information which the government considers might reveal military movements or policies is described in great detail.

In the statement announcing the new regulations George Creel, chairman of the committee, says that "repeated and serious violations of the voluntary censorship have been attempted to be excused on the score of misunderstanding" and that a "re-statement" is made with the idea that hereafter there shall be no room for doubt regarding the committee's desires.

The instances in which the more serious charges of violation have been made, however, have not resulted from misunderstanding of the committees' rules, but from following them implicitly. Those instances have involved publication of dispatches passed by the European censors, announcing the arrival of military units in Europe. On that subject the committee's only standing rule, contained in the general list promulgated May 28 and never replaced nor revoked, was as follows:

"All messages received from abroad by cable or wireless are censored at the point of dispatch or receipt and are free for publication, unless some especial circumstances arouses the suspicion of the editor."

The new rules, instead of restating the principle, substitute for it a prohibition on publication of:

"Information of the arrival at any European port of American war vessels, transports or any portion of an expeditionary force, combatant or non-combatant, until announcement is authorized by the Secretary of War or the Secretary of the Navy."

The committee's statement follows:

"The desires of the government with respect to the concealment from the enemy of military policies, plans and movements are set forth in the following specific requests. They go to the press of the United States directly from the Secretary of War and the Secretary of the Navy and represent the thought and advice of their technical advisers.

"For the protection of our military and naval forces and of merchant shipping it is requested that secrecy be observed in all matters of:

"1. Information in regard to the train or boat movements of troops. Such information is at all times and under all circumstances dangerous and should be scrupulously avoided.

"2. Information tending directly or indirectly to disclose the number or identity of troops in the expeditionary forces abroad.

"3. Information tending to disclose the names of line officers in expeditionary forces and reference to individual units of these forces. Only names of staff officers are permissible.

"4. Information calculated to disclose location of the permanent base or bases abroad.

"5. Information that would disclose the location of American units or the eventual or actual position of the American forces at the front.

"6. Information of the movement of military forces toward seaports or of the assembling of military forces near seaports from which inference might be drawn by any intention to embark them for service abroad, and information of the assembling of transports or convoys and information of the embarkation itself.

"7. Information of the arrival at any European port of American war vessels, transports or any portion of an expeditionary force, combatant or non-combatant, until announcement is authorized by the Secretary of War or the Secretary of the Navy.

"8. Information of the time of departure of merchant ships from American or European ports or information of the ports from which they sailed.

"9. Information indicating the port of arrival of incoming ships from European ports or after their arrival indicating or hinting at the port at which the ship arrived.

"10. Information as to convoys and as to the sighting of friendly or enemy ships, whether naval or merchant.

"11. Information of the locality, number or identity of warships belonging to our own navy or to the navies of any country at war with Germany. Papers published in ports should with especial care refrain from giving information to enemy agents in regard to ships stationed or calling at such ports. Because dangerous news is known locally it does not follow that it can be safely published. Non-publication of dangerous news obliges the enemy to rely on spies actually in the localities concerned, thus adding difficulties and delay in its transmission.

"12. Information of the identities of American merchant ships defending themselves against submarines and the identities of their captains, their gun crews and crews. No matter from which side of the ocean comes the news, it is asked that this information be withheld from publication. Editors will appreciate the importance of co-operation to withhold from the enemy such information as might expose the officers and men of merchant ships to the danger of cruel and outrageous reprisal.

"13. Information of the coast defences of the United States. Any information of their very existence, as well as the number, nature or position of their guns, is dangerous.

"14. Information of the laying of mines or mine fields or of any harbor defences.

"15. Information of the aircraft and appurtenances used at government aviation schools for experimental tests under military authority.

"16. Information of all government experiments in war material.

"17. Information of secret notices issued to mariners or other confidential instructions issued by the navy or the Department of Commerce relating to lights, lightships, buoys or other guides to navigation.

"18. Information as to the number, size, character or location of ships of the navy or of the merchant marine ordered laid down at any port or shipyard or in actual process of construction or information that they are launched or in commission.

"19. Information relating to drydocks and to all classes of work, repairs, alterations or construction performed in connection therewith.

"20. Information of the train or boat schedules of travelling official missions in transit through the United States.

"21. Information of the transportation of munitions or of war material.

"Photographs conveying the information specified above should not be published.

"Repeated and serious violations of the voluntary censorship have been attempted to be excused on the score of misunderstanding or lack of positive information. Pains have been taken to make this re-statement of necessary secrecies so complete and explicit as to leave no room for honest ignorance or dishonorable evasion. Neither do the requests go forth with any time limit. Their application covers the period of war. At no point do they touch opinion or criticism, being concerned entirely with the protection of the lives of America's defenders and the success of military plans.

"These requests go to the press without larger authority than the necessities of the war making branches. Their enforcement is a matter for the press itself. To the overwhelming proportion of newspapers, who have given unselfish, patriotic adherence to the voluntary agreement the government extends its gratitude and high appreciation.

"THE COMMITTEE ON PUBLIC INFORMATION,
"By GEORGE CREEL, Chairman."
—*N. Y. Herald*, 31/7.

CABLE RULES.—The Commercial Cable Company, under date of July 26, has published its rules and regulations for the transmission under the war censorship of messages by its lines. These are, in part, as follows:

"All cablegrams to and from the United States must now conform to the United States censorship regulations.

"Transatlantic cablegrams must be written in plain language, either English or French, or in one of the authorized codes.

"The authorized codes for transatlantic cablegrams are: To British territory (including Egypt), France, Tunis, Algiers, French colonies, Portugal and Portuguese colonies, and for Italy, except the towns of Ancona, Bari, Barletta, Brindisi, Porto Corsini, Taranto or Venezia (Venice):

"A. B. C., fifth edition (not including the 'improved' or five letter edition).

"Scott's, tenth edition.

"Western Union (not including the five letter edition).

"Lieber's (not including the five letter edition).

"Bentley's (not including the oil and mining supplements).

"Broomhall's Imperial Combination Code.

"Broomhall's Imperial Combination Code, rubber edition (not admitted to Italy).

"Meyer's Atlantic Cotton Code, thirty-ninth edition.

"Riverside Code, fifth edition (not admitted to Italy).

"A. Z. (France, Tunis, Algiers and French colonies only).

"The name of the code used must be written on the message form by the sender, but no charge will be made for its transmission.

"The Italian language may be used in cablegrams to Italy, Libya (Tripoli) and Italian possessions in East Africa.

"Cablegrams to the West Indies, Hawaii, Guam, the Philippines, China and Japan may be in plain language, English, French or Spanish or in authorized codes. The authorized codes are:

"A. B. C., fifth edition (not including the 'improved' or five letter edition).

"Scott's tenth edition.

"Western Union (not including five letter edition).

"Lieber's (not including five letter edition).

"Bentley's Complete Phrase Book (not including the oil and mining supplements).

"Broomhall's Imperial Combination Code.

"Broomhall's Imperial Combination Code, rubber edition.

"Meyer's Atlantic Cotton Code, thirty-ninth edition.

"Riverside Code, fifth edition.

"A. Z. (not authorized in cablegrams to British possessions).

"The name of the code used must be written on the message form by the sender. No charge will be made for its transmission.

"Transpacific cablegrams to countries of Asia, Australasia or Europe, other than the Philippines, China and Japan, are subject to the same restrictions as transatlantic cablegrams to the same countries.

"No cablegram will be accepted for transmission to Germany or to any country assisting Germany in the prosecution of the war.

"The address must be complete, but code addresses properly registered before July 1, 1914, may be used on transatlantic cablegrams, and code addresses properly registered before January 1, 1917, may be used on all cablegrams not passing over transatlantic cables.

"All cablegrams must be signed; in the case of an individual, by the surname at least; in the case of a firm or organization, by the surname of a responsible member of the firm or officer of the organization when satisfactory information concerning him is on file with the censor, or by an abbreviated signature of two or more words from the incorporated title when understandable."—*N. Y. Herald*, 1/8.

CENTRALIZATION.—The following editorial appeared in the *New York Herald* August 8:

"With all the fervor which marked the earlier predictions in the United States Senate that the Louisiana Purchase would be found unconstitutional, Senator King, of Utah, has predicted that the food control act, to become a law to-day, will be pronounced unconstitutional. What the strict constructionist of every day has failed to take into account is the inherent elasticity of the 'sacred document,' which, fortunately, has made it possible for the American people to meet every crisis with common sense. Unquestionable at this time, when the country is involved in the greatest war in its history, it is the desire of the American people that their power shall be so centralized as to be effective. Unquestionably, also, the Supreme Court will hold it to be within the province of Congress to provide for such centralization. That is all the food control act means.

"It is true that this legislation places in the hands of the President powers unprecedented. Instead of finding fault with that fact, the American people approve it. They realize, if some members of Congress do not, that the problem confronting the nation at this time is gigantic and that in order to properly meet the demands of that problem the nation must express its will through one man.

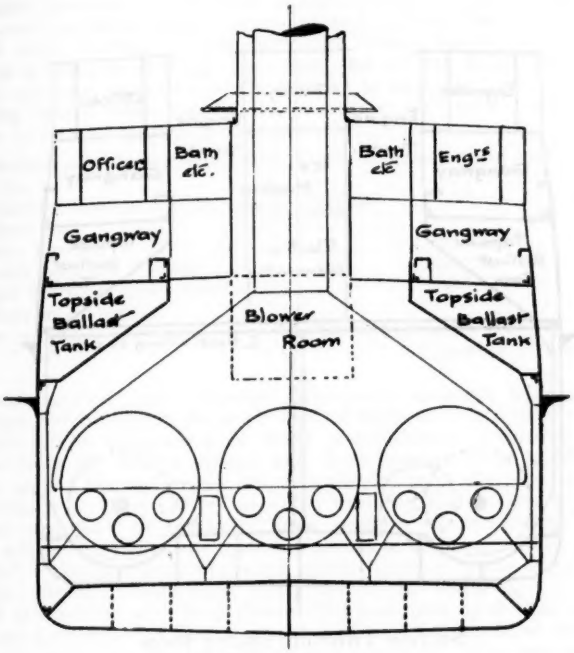
"Outside of Washington there is no fear of the President. The proposal to create a triumvirate control over food, which the Senate first approved, had no popular support. To the man in the street it was clear from the beginning that food administration is a 'one man job.' The people were against the proposed triumvirate just as they were opposed to the proposal to create some kind of committee of Congress to divide with the Presi-

dent the responsibility for the conduct of the war. The people are willing to trust the President. They would avoid placing additional responsibility upon him as he would avoid taking it, if that were possible. It is not possible, however. Manifestly the exigencies of war call for centralization of the higher powers of the people, and that centralization can be only in the President."

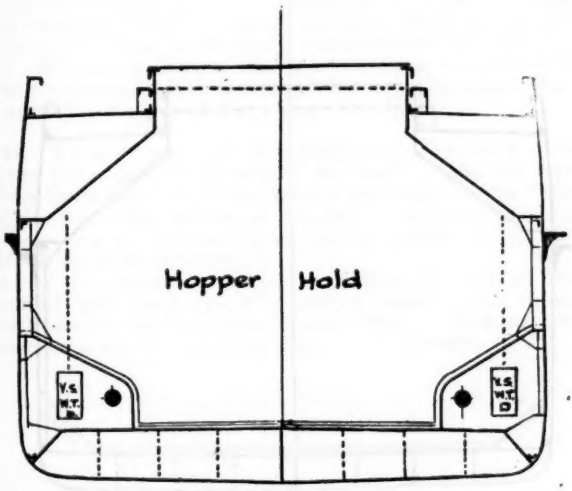
MERCHANT VESSELS TO BE PROVISIONED FOR ROUND TRIP.—At the request of the Navy Department, Secretary Redfield, of the Department of Commerce, has issued an order requiring all American vessels sailing for Europe to be provisioned for the round voyage. This is done to relieve the drain on European stores.—*The Nautical Gazette*, 9/8.

STATUS OF SEIZED SHIPS AFTER THE WAR.—An interesting question to be answered after the war relates to the status of the German merchant vessels which have been taken over by the United States Government for use as army transports and cargo carriers. Technically, these vessels have not been seized, but have merely been requisitioned for the period of the war, and the United States Government would be obliged to compensate their owners if it followed the provisions of the Hague Convention of 1907 relating to the status of enemy merchant ships at the outbreak of hostilities. The United States did not ratify this treaty, which, by the way, was proposed by the German Emperor, but assuming that our government agreed to follow its provisions, this fact would not settle the question, for the simple reason that the United States has an immense repair bill to present to the owners of the German vessels on account of the damage accomplished by their crews when they wrecked the engines. In some cases, it is believed, this bill will amount almost to the value of the vessel. There is still another question. If, in the course of its investigations, our government has discovered that some of the German vessels were intended for conversion into warships, they could hardly claim the status of peaceful merchantmen and might be considered as legitimate prizes of war. Again, the German merchantmen might be detained after the war as compensation for the loss of American merchant ships illegally destroyed by German submarines. Altogether, the question is a complicated one for the international lawyers to settle.—*The Nautical Gazette*, 9/8.

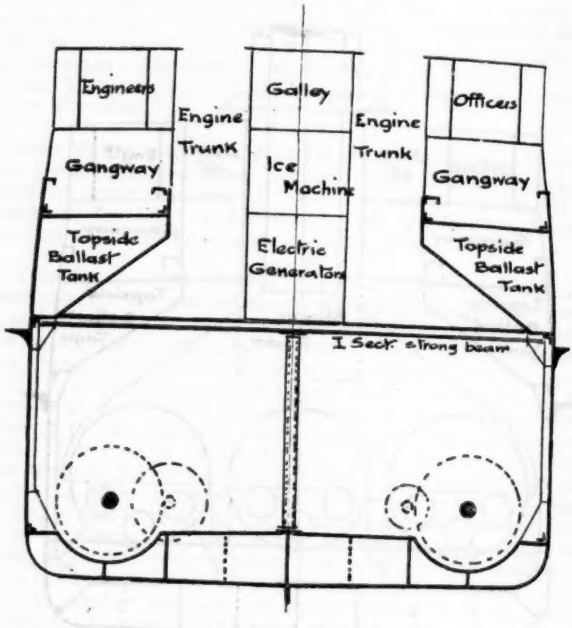
MAKING SHIPS UNSINKABLE.—According to a report from Washington which appeared in the daily press, the United States Shipping Board is contemplating signing contracts for practically unsinkable ships. The report stated that suggestions and rough plans for the vessels had been outlined to the board and a decision was expected this week. The vessels referred to appear to be modified tank steamers divided into a number of watertight compartments for stowing general cargo. This arrangement would furthermore admit of quick transportation into oil tankers. It was said that with such a construction a vessel could be hit many times and still float by means of the reserve buoyancy derived from the undamaged compartments. It would be most interesting to ascertain whether the proposed mode of construction is not after all but an adaptation of the Simpson Patent Improved Topside Ballast Tank which is already in use in several steamers of recent construction and which was recently placed before the Shipping Board as a means of protecting vessels against submarine attacks. It is well known that the first colliers built in this country were designed by the patentee, Mr. George Simpson, Naval Architect. These vessels were intended for the New England coal trade and since then a number of boats of the same class, including large United States naval colliers, have been built with Simpson Patent Improved Topside Ballast Tanks. But it is not so generally known that vessels of this construction are practically unsinkable under conditions which would send the ordinary cargo carrier to the bottom. This is due to the fact that in



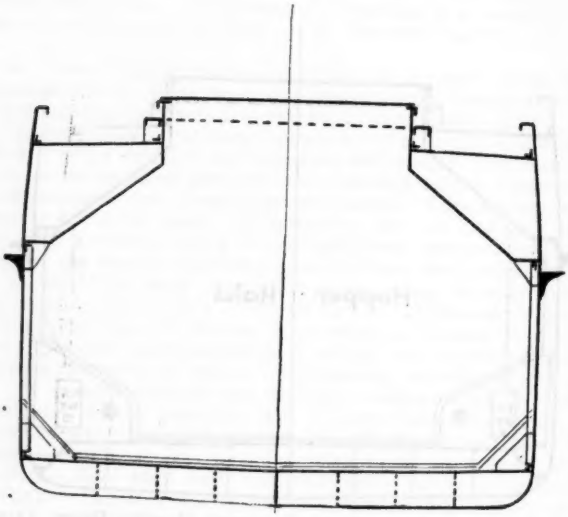
SIMPSON TOPSIDE BALLAST TANK—SECTION THROUGH BOILER ROOM



SECTION THROUGH AFTER HOLD SHOWING PATENT BILGE TUNNELS.



SECTION THROUGH ENGINE ROOM



SECTION THROUGH FORWARD HOLD

the loaded condition the Topside Ballast Tanks are empty, and as these tanks consist of prism-shaped spaces extending from the water-line to the weather deck, forming consequently huge reserve buoyancy spaces, in the event of a torpedo striking the vessel and all the holds being flooded, there is sufficient buoyancy in these tanks to keep the vessel afloat. The following figures taken from a ship in service will show conclusively the amount of reserve buoyancy thus attained:

Total weight of ship including fuel, fresh and feed water and stores	3,050	tons
Total displacement at molded depth amidship	10,420	"
Total buoyancy	7,370	"
All holds flooded	5,750	tons
All double bottoms flooded	898	"
Fore and aft peak tanks flooded	568	"
Total loss in buoyancy	7,216	"
Reserve buoyancy with holds, double bottoms and peaks flooded	154	"

—*Shipping Illustrated*, 4/8.

UNDERSHIRTS OF CREW TREATED.—The naval surgeons have made some important provisions for the protection of those on board ship in the event of battle. The suggestion of these precautionary measures has been derived from the British service and there appears to be a difference of opinion among the experts of our own service as to the real necessity for the action now taken. It is provided that the undershirts worn by the enlisted men shall be immersed in a solution of ammonium phosphate which will render the garment less inflammable, although not by any means fireproof. This is intended to ward against ignition in the event of a flash of flame. Some consideration was given, in this connection, to the adoption of undershirts with long sleeves, but inasmuch as the bureau of supplies and accounts had just awarded contracts for 2,000,000 shirts of the short-sleeved variety, the proposition was laid aside. Men may wear gloves which cover the hands and will give protection well above the wrist on account of the length of glove. It is also contemplated to encourage the use of a neck covering and by this combination there will be the least possible portion of arms and neck exposed to the flame. A suggestion has also been made that there be issued life belts which may be worn on the battle station, in which event those articles would probably be rendered fireproof. Emergency apparel of this character is considered as not only adding to the security of the personnel but contributing to the confidence of the wearers.—*Army and Navy Register*, 11/8.

MARINE "CAMOUFLAGE."—A demonstration of marine camouflage is being given these days to passengers on vessels plying the waters of the upper New York Bay. A British freight steamship of the "tramp" type, lying off the Bay Ridge section of Brooklyn, is undergoing a change from the dull marine gray so much in use among vessels of the allied nations to deceive Prussian submarines.

Instead of the customary solid gray shading, the hull of the vessel is being painted with black and gray stripes, about 4 feet in width. The smokestack already has been given its camouflage of black and gray squares, and resembles a leg of a domino suit.—*N. Y. Herald*, 10/8.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

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BRITISH TRANSPORT ON THE ROCKS AFTER HAVING BEEN TORPEDOED BY A GERMAN SUBMARINE

British Transport on the Rocks After Having Been Torpedoed by a German Submarine

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NAVAL WAR NOTES

Prepared by Lieutenant I. C. Kidd, U. S. Navy

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STRATEGY

Playing the German Game.—We have noticed that in certain quarters there is a growing demand for what is called a more aggresive policy on the part of the British Navy. There is an evident attempt to create the impression that Great Britain's naval policy has proved to be ineffective, because it has failed to suppress the U-boat piracy. It is urged that the time has come for the British fleet to make a grand assault on the German bases, Kiel, Heligoland, Wilhelmshaven, etc. These exponents of the true strategy and tactics would have Admiral Beatty, with battle flags flying and an explosive, "Damn the torpedoes" on his lips, rush boldly through the German mine fields and, Kaiser-like, hack his way through to victory.

Well, 'twould be a thrilling spectacle; and to no one would it bring such unadulterated delight as to Admiral von Capelle and the German Admiralty. Nothing would give these gentlemen greater joy than to see the British fleet floundering in the uncharted channels and mine fields of the Bight of Heligoland and exposed to the terrific fire of the Heligoland and Cuxhaven 16-inch gun batteries.

Equally absurd is the suggestion that the way could be cleared by sweeping and countermining; for a channel would have to be opened through 20 miles of mine fields, during which operations the trawlers and destroyers would be exposed to the combined fire of the sea coast batteries and the German fleet.

But Churchill says it should be done. Well, if Churchill wants to add to the fiasco of Antwerp and the tragedy of the Dardanelles a third disaster, compared with which the Dardanelles would be child's play, he is certainly going the way to get it.

The submarine problem can never be solved by piling up the British fleet upon the impregnable sea coast defences of the enemy. It can be solved by shutting up the U-boat fleet within the North Sea by a mine-barrier from Scotland to Norway. How long shall we have to wait for the British Admiralty to undertake this perfectly feasible engineering work?—*Scientific American*, 28/7.

NAVAL STRATEGY IN LONDON.—Our naval officers who have been in London have encountered an interesting state of affairs in the form of a controversy among the British service experts over the strategy assigned to the grand fleet. The policy of the former admiralty appears now to have been retained by the reorganized body, and the fact that Admiral Sir Jellico is chief of the naval staff supports the view that there will be no material change—that is to say, there is no idea of leading the dreadnought squadrons against the batteries and mine fields of the German coasts in an attempt to blaze a way into the submarine lair. The grand fleet remains as before at its war stations, ready at any moment to perform the function for which it was created, that of fighting and destroying the enemy's ships. Critics of that policy are being reminded by its advocates that the German battle fleet is very much in existence, a fact that is in danger of being overlooked apparently in some quarters. It is remarked, too, that none but the most modern and powerful vessels carrying guns of the longest range and the greatest weight could put up a fight against the batteries which defend the Jade and Elbe. While certain of the British monitors carry guns of the requisite power, their batteries are too limited to maintain an intensive and continuous bombardment, which alone could be expected to silence the concealed and formidable defences ashore. Besides, a disaster to the grand fleet would have consequences infinitely more ruinous than the most effective and prolonged submarine war on British shipping. Certainly there would have to be a reduction in the strength of the fleet and incur, as well, grave risks if any serious attack were undertaken on the German bases. This could only be achieved by using the most powerful battleships carrying big armaments of the heaviest long-range guns. It is observed that little is said in support of the plan to build special ships for the "war on coasts," especially as every British shipyard, as is the case in this country, is crowded to its capacity with the construction of destroyers and cargo vessels—*Army and Navy Register*, 21/7.

GERMAN OPERATIONS.—Germany has decided to concentrate her submarine operations in the Atlantic and North Seas and to leave to Austria submarine activities in the Southern Seas. This change, according to advices reaching Washington, has been decided upon by Germany because of the entrance of the United States into the war. Germany has furnished Austria a sufficient number of submarines to patrol southern waters.

It is the purpose of Germany to withdraw practically all of her own U-boats from the Mediterranean. Austrian crews are now operating German-built submarines in the Mediterranean and the Adriatic. An allied naval expert, quoting information received officially from the Admiralty of an Entente country, revealed the change in plans of the Kaiser.

German-built boats no longer make the sea trip to reach southern waters, it is said. They are transported in parts to Pola, the Austrian naval base, and to the Bosporus, where they are assembled and furnished with Austrian crews which take them into the Mediterranean travel lanes.

The allied naval expert said that navigation in the Mediterranean and in the Adriatic was a little less dangerous now than it had been during the last few months, as the Allies had taken special measures.

It is disclosing no military secret to state that Italy has closed the Adriatic by stretching lines between Brindisi and Avlona and between Taranto and Avlona, but Austrian submarines with bases in the Ægean Sea are operating in the Ægean, the Ionian and Mediterranean, and occasionally Austrian U-boats escape through the Adriatic lines.—*N. Y. Times*, 10/8.

GERMANY'S HOLD ON BELGIAN COAST.—The *New York Herald's* naval correspondent writes:

It is hardly surprising that there is at last on foot in Germany a counter agitation against that of the pan-Germans for the annexation of Belgium as

the irreducible minimum of any peace settlement. Twelve months passed since the German Navy League presented to the imperial chancellor and the federal governments the demand for the retention of the Flanders coast line. In the interval the demand has been very generally approved in the Fatherland.

Now the possession of the Belgian coast is being represented, in at least one quarter, as having mixed advantages for Germany. Captain Persius, in the *Berliner Tageblatt*, argues that the addition of the coast to Germany would be a source of weakness rather than strength, a burden rather than a help. It would absorb large sums for defence works and up-to-date fortifications, which would be unable to protect German commerce down the channel and overseas.

That the captain should give expression to such views at this juncture is a reminder that the situation off the Belgian coast has changed recently in favor of the Allies. After all, discussion of whether Germany shall or shall not retain the territory she seized in 1914 is rather beside the mark, since, as the Allies have declared more than once their determination to restore Belgium, it is not at all likely that they would leave her ports in German hands. But the naval question involved in the struggle for the possession of those coast towns is highly interesting and important.

Captain Persius is quite right in reminding his countrymen that, although the possession of the Flanders coast would bring Germany nearer to England, it also would bring England nearer to Germany, and so need a vast amount of money for its protection. The warning is no idle one. The naval chiefs in Berlin would not rest content until they had made the seaboard from Nieuport to Zeebrugge like that of their own coast line, which General von Ardenne said recently in the *Berliner Tageblatt* was "as prickly as a hedgehog, which one does well not to grasp unless one has no fear of bloody fingers."

One reason, indeed, why the German forces in the Belgian coast sector have been left so much alone is that the length of coast line they hold is so comparatively short, lending itself to what may be called intensive fortification. Moreover, the geographical and natural conditions confer many advantages on the defenders, especially in regard to mines. Rear Admiral Mazzinghi, a distinguished Italian seaman, has said that "the snares of mines and submarines give to-day to the attacked advantages which not only counterbalance, but in many cases surpass those which, till now, were recognized as belonging to the attacker."

Similarly the French Minister of Marine, Admiral Lacaze, in an interview granted to American journalists in February last said that a moment's study of the map would show how inadvisable it would be for the French, Italian and British fleets to go in after the enemy at all costs in his bases. The mouth of the Elbe, for example, is a network of narrow channels easily to mine. Its entrance is so difficult that two German cruisers returning after the battle of Jutland are said to have been injured there by their own mines. Admiral Lacaze added: "To attack under such conditions would be folly. We must wait for the enemy to come out and meet us, as they are bound to do sooner or later."

With a view to hastening that day the desirability of the Allies advancing along the Belgian coast, and, by the combined efforts of their sea, land and air forces, destroying the enemy strongholds which have grown up there is manifest. There can be no question about that coast having been more or less a thorn in the side of England ever since the Germans took possession of it in the course of their mad rush for Calais, which the British Navy only just checked in time.

That the Flanders coast line has been allowed to remain so long in German hands has been due less to its impregnability than to the policy of the war cabinet in deciding that the ships and troops and material necessary for retaking it would be more profitably utilized elsewhere. Whether, in arriving at that decision, the Allies underestimated the menace

of Zeebrugge as a haunt of submarines for commerce destruction, submarine mine layers, destroyers for making raids on the English coast and traffic, Zeppelins and aeroplanes for scouting over the lower part of the North Sea and for bombing attacks both by night and day—that is, of course, another question.

The fact, however, that it has not up to the present been considered expedient to undertake a combined naval and military expedition to root out the Germans from the Belgian coast has not precluded the delivery of constant assaults, both naval and aerial, against their positions to lessen the value of those places as strongholds for attacks on England. Early in the war their capacity for mischief was more or less kept under by the bombardments carried out by the ships of the Dover patrol and the aircraft from Dunkirk, but a long period followed when such attacks became very infrequent, enabling the Germans to perfect their arrangements.

The period of British inactivity in that quarter passed with the advent to power of a new admiralty board, impressed with the serious menace to our naval interests of this hornets' nest around Zeebrugge. Air raids by the Allies were almost of daily occurrence, and the photographic records published showed them to be increasing in effectiveness. The same applies, perhaps in less degree, to bombardments from the sea. In the last great attack by the Dover patrol it was reported that Ostend was wiped out as a naval base, all the shipping being removed from the harbor. Zeebrugge, having the benefit of canal communication with Bruges is a more difficult place to deal with in that way. Its docks and other establishments have, however, been bombed several times by the royal naval air service, and in time the enemy's power should be curbed here also.

The new features in the recent operations has been the co-operation of the British Army, to whose presence and work, especially by artillery, in the Belgian coast sector the German communiques of late have made frequent reference. The unity of direction promises well. It was absolutely essential that any operations having for their ultimate object the capture of Ostend and Zeebrugge must be of an amphibious nature, the troops advancing as the fleet off the coast covered them and protected their flank. How mistaken it is to ignore what the unhappy Dardanelles adventure showed. Had the military forces been on the spot and ready for action when the first naval attack on the forts was made, the troops could have occupied each battery as the fleet reduced it or drove its gunners to take cover. Instead of that, when the army was ready the all-important element of surprise had been lost.

But the Dardanelles undertaking was not all loss. In regard to the attack of forts by ships' guns and a host of similar professional questions, a great mass of valuable information and experience was gained which should prove a great asset in the amphibious warfare of the future.—*Washington Post*, 29/7.

ALLIES' NAVAL OFFENSIVE.—A more resolute use of sea power by the Allies is urged in an article in *The Observer* by its naval correspondent. The latter says:

"The fact that Admiral Sims joined with Admiral Jellicoe and the naval representatives of France and Italy in the conference with the allied statesmen in Paris is the most hopeful sign we yet have had of an intention to use the Allies' sea power to the full. The great accession of force represented by the intervention of the United States ought to bring the hitherto practically uncontested German control of the Baltic Sea to an end.

"But no effective naval offensive can be undertaken unless it is made part of the primary war plans of the Allies and with an air force which may be considered necessary for the purpose by the joint Naval and Military Staff. It is no use sending the great surplus fleet we and the Allies possess into the Bight of Heligoland or into the Baltic merely to trail its coast. Sea power will be used effectively if it employs the forces of the alliance

along a new line with a definite objective of striking at the enemy's vitals." —*N. Y. Times*, 30/7.

SHIP TO ALLIES VIA PACIFIC SUGGESTED.—Washington B. Vanderlip, a mining engineer, has a plan for solving the U-boat problem which he holds is perfectly feasible and will win the war. He proposes to block with nets the Straits of Gibralter (10 miles), the straits of Otranto, the heel of Italy (40 miles) and the Dardanelles (10 miles) and turn all freight shipments to the west. He adds:

"Send all allied ships through the canal to the ports of San Diego, Los Angeles, San Francisco, Oakland, Portland, Tacoma, Seattle and Vancouver.

"Put the railroads in shape to handle the traffic.

"Stop the building of useless wooden boats. Put some of that appropriation into freight cars and locomotives. The former, we know, we can build by the mile from green timber. Then we can go ahead with the sensible project of steel ships.

"Japan will naturally furnish her great merchant marine, and with no future losses our steel plants can turn their attention to munitions and guns.

"Freight can be landed in France and transshipped across country to Calais, thence to Dover.

"Is it not wiser to be absolutely sure that you are going to deliver food to England in 90 days than to have it sunk?"—*Washington Post*, 30/7.

ATLANTIC

REAR ADMIRAL GLEAVES' REPORT.—Details of the attacks by German submarines upon the first expedition of American troops sent to France became known for the first time on August 1, when the report of Rear Admiral Gleaves, commanding the naval convoy, was made public by Secretary Daniels.

The first attack was made on Admiral Gleaves' flagship, leading the first group of the expeditionary force, and at least two submarines were indicated to be engaged. The admiral stated the belief that the U-boats had knowledge of the coming of the troop-ships, and were on watch for them.

The second group of transports also was attacked by two submarines, one of which apparently was sent to the bottom by a bomb dropped from an American destroyer. There is disagreement among officers of the third group as to whether they were attacked, but much evidence is presented to indicate that they also were assailed.

Secretary Daniels made the report public, with certain military information deleted, after he had sent an uncensored copy in confidence to the Senate naval committee, members of which recently inquired as to the truth of charges in the Senate that the official account of the attack published on July 3 was greatly exaggerated. When the committees' inquiry first was made, the full report from Admiral Gleaves had not been submitted to the department, but the Secretary replied that he was willing to show the members the brief dispatch from which the first announcement was made.

In his letter of transmittal, Mr. Daniels recalled these facts, and continued:

"I am sending you the exact text of the report of Rear Admiral Gleaves, giving in detail the account of the submarine attacks for the use of the naval affairs committee. I am also sending you a copy for the press exactly in the words of the official report, the only changes being that the names of the ships are represented by letters and not by the real name of the ship, with the omission also of certain military information that cannot be published under naval regulations. However, the omissions are noted. Everything with reference to the attacks of the submarines is given in the exact words of the official report."

The report was prepared by Admiral Gleaves while at a French port and was submitted to Admiral Mayo, in command of the Atlantic fleet, who forwarded it to the Navy Department. Its full text as made public follows:

"1. About 10.15 p. m., June 22, the first group of the expeditionary force, of which the flagship was the leader, encountered the enemy's submarine in latitude—N., longitude—W.

"2. At the time it was extremely dark, the sea unusually phosphorescent; a fresh breeze was blowing from the northwest which broke the sea into whitecaps. The condition was ideal for a submarine attack.

"3. (Paragraph 3 gives the formation and names of the vessels together with the speed they were making and the method of proceeding, nothing else. It is therefore omitted for obvious reasons).

"4. Shortly before the attack the helm of the flagship had jammed, and the ship took a rank sheer to starboard; the whistle was blown to indicate this sheer. In a few minutes the ship was brought back to the course. At this time the officer of the deck and others on the bridge saw a white streak about 50 yards ahead of the ship, crossing from the starboard to port at right angles to our course. The ship was immediately run off 90 degrees to starboard at full speed. I was asleep in the charthouse at the time. I heard the officer of the deck say, 'Report to the admiral a torpedo has just crossed our bow.' General alarm was sounded, torpedo crews being already at their guns. When I reached the bridge the *A* and one of the transports astern had opened fire, the former's shell fitted with tracers. Other vessels of the convoy turned to the right and left, in accordance with instructions. *B* crossed our bow at full speed and turned toward the left column in the direction of the firing.

"5. At first it was thought on board the flagship that the wake was that of a torpedo, but from subsequent reports from other ships, and in the opinion of Lieutenant X who was on the bridge, it was probably the wake of the submarine boat itself. The torpedoes passed close to the *A* from port to starboard, one about 30 yards ahead of the ship and the other under her stern, as the ship was turning to the northward. Captain Y reports the incident thus:

"'Steaming in formation on zigzag courses, with base course 75 degrees p. s. c., standard speed. At 10.25 sighted wake of a torpedo directly across our bow about 30 yards ahead of the ship. Changed course 90 degrees to left and went to torpedo defence stations. Fired two 1-pounder shots and one 5-pounder shot from port battery in alarm, in addition to six blasts from siren. Passed through two wakes, one being that from the U. S. S. *C* in turning to northward, the other believed to have been from the passing submarine. A second torpedo wake was reported at about 10.35 from after lookouts. After steaming in various courses at full speed resumed course. At 12 set course 56 degrees p. s. c.'

"6. The torpedo fired at the *D* passed from starboard to port, about 40 yards ahead of the ship, leaving a distinct wake, which was visible for about 400 or 500 yards. Colonel Z, U. S. A., was on the starboard wing of the bridge of the *D* at the time, and states: 'I first saw a white streak in the water just off the starboard bow, which moved rapidly across the bow very close aboard. When I first saw it it looked like one very wide wake and similar line; with it there appeared two distinct and separate wakes with a streak of blue water between. In my opinion, they were the wakes of two torpedoes.'

"7. The submarine which was sighted by the flagship was seen by the *B* and passed under that ship. The *B* went to quarters. When the alarm was sounded in the *B* Lieutenant W was roused out of his sleep and went to his station and found unmistakable evidence of the presence of a submarine. He had been there only a few seconds when the radio operator reported, 'Submarine very close to us.' As the submarine passed the *B* and the flagship's bow, and disappeared close aboard on our port bow, between the columns, it was followed by the *B* which ran down between the columns,

and when the latter resumed her station she reported that there were strong indications of the presence of two submarines astern which were growing fainter. The *B* was then sent to guard the rear of the convoy.

"8. When I was in Paris I was shown by the United States naval attaché, a confidential official bulletin of information issued by the general staff, dated July 6, which contained the following:

"'Punta Delgada, Azores, was bombarded at 9 a. m., July 4. This is undoubtedly the submarine which attacked the *E* on June 25, 400 miles north of the Azores and sank the *F* and *G* on the 29th of June, 100 miles from Terceira (Azores). This submarine was ordered to watch in the vicinity of the Azores, at such a distance as it was supposed the enemy American convoy could pass from the Azores.'

"9. It appears from the French report just quoted above, and from the location of the attack, that enemy submarines had been notified of our approach, and were probably scouting across our route. It is possible that they may have trailed us all day on June 22, as our speed was well within their limits of surface speed, and they could have easily trailed our smoke under the weather conditions without being seen. Their failure to score hits was probably due to the attack being precipitated by the fortuitous circumstances of the flagship's helm jamming and the sounding of her whistle, leading the enemy to suppose he had been discovered.

"10. The *H*, leading the second group, encountered two submarines, the first about 11.30 a. m., June 26, 1917, in latitude—N., longitude—W., about 100 miles off the coast of France, and the second two hours later. The *I* investigated the wake of the first without further discovery. The *J* sighted the bow wave of the second at a distance of 1500 yards, and headed for it at a speed of 25 knots. The gun pointers at the forward gun saw the periscope several times for several seconds, but it disappeared each time before they could get on, due to the zigzagging of the ship. The *J* passed about 25 yards ahead of a mass of bubbles which were coming up from the wake and let go a depth charge just ahead. Several pieces of timber, quantities of oil, bubbles and debris came to the surface. Nothing more was seen of the submarine. The attacks on the second group occurred about 800 miles to the eastward of where the attacks had been made on the first group.

"11. The voyage of the third group was uneventful.

"12. In the forenoon of June 28, when in latitude—N., longitude—W., the *K* opened fire on an object about 300 yards distant which he thought was a submarine. The commander of the group, however, did not concur in this opinion, but the reports subsequently received from the commanding officer of the *K* and Lieutenant V, are too circumstantial to permit the incident from being ignored. The commanding officer states:

"'The only unusual incident of the trip worth mentioning was on the 28th day of June, about 10.05 a. m., when lookouts reported something right ahead of the *K*. (I had the bridge at the time.) When I looked, I saw what appeared to be a very small object on the water's surface, about a foot or two high, which left a small wake; on looking closer and with the aid of binoculars, I could make out a shape under the water about 250 or 300 yards ahead and which was too large to be a black fish, lying in a position about 15 degrees diagonally across the *K's* course.

"'I ordered the port bow gun to open fire on the spot in the water and sounded warning siren for convoy; when judging that ship had arrived above the spot first seen, I ordered right rudder in order to leave the submarine astern.

"'A minute or two later, the port after gun's crew reported sighting a submarine on port quarter, and opened fire at the same time. The lookouts from the top also reported seeing the submarine under the water's surface and about where the shots were landing.

"'The ship kept zigzagging and firing from after guns every time something was sighted.

"'Lieutenant V, U. S. N., was in personal charge of the firing, and reports that he saw, with all the gun crews and lookouts aft, the submarine fire two torpedoes toward the direction of the convoy, which sheered off from base course to right 90 degrees when alarm was sounded.

"'All the officers and men aft had observed the torpedoes traveling through the water, and cheered loudly when they saw a torpedo miss a transport. They are not certain though which one it was, as the ships were not in line and more or less scattered.

"'The gunnery officer and all the men who were aft at the firing are certain that they saw the submarine and the torpedoes fired by same.'

"'A separate report of Lieutenant V, U. S. N., the gunnery officer, is herewith appended:

"'The *K* kept zigzagging until it was considered that danger was past, and in due time joined the escort and convoy formed column astern.

"'Report by signal was made to group commander of sighting submarines and torpedoes.'

"13. (Paragraph 13 deals exclusively with a recommendation as to the best methods to be employed in the future for the purpose of saving life. It is plain this ought not to be made public.)

"14. Copies of reports of commanding officers flagships *A*, *D*, and *H*, are inclosed, also copy of report of Lieutenant V, of the *K*.

"ALBERT GLEAVES."

—*Army and Navy Register*, 4/8.

ARMED STEAMER "GRACE" SUNK.—Sinking of the American steamer *Grace* and the killing of three men, one of them an American, and the injury of two members of the naval armed guard was announced July 16 by the State Department.

The steamer was owned by the Standard Commercial Steamship Corporation, 15 Whitehall Street, New York. She was sunk by a torpedo from a submarine.—*N. Y. Times*, 17/7.

"U-B-23" DISABLED; INTERNED IN SPAIN.—A despatch dated Coruna, July 31, said: "The German submarine *U-B-23* anchored in the harbor here late yesterday evening. She entered the roadstead with only her periscope emerging from the water.

"The submarine had been seriously damaged, but her commander and crew refused to tell the causes of the accident. She anchored beside the German interned ship *Belgrano*."

Premier Dato announced, July 31, that the German submarine *U-B-23*, which had anchored in Coruna harbor, had been taken to Ferrol, the chief naval arsenal of Spain, 12 miles northeast of Coruna. He added that the government intended to keep strictly to the terms of the recent regulation regarding the entry of belligerent submarines into Spanish ports.

The German submarine *U-B-23* is of the coastal type. She was built in 1915-16, is 118 feet long, and carries a crew of 20 men.

King Alfonso, on June 30, signed a decree which had for its object the avoidance of a repetition of incidents like the one at Cadiz, where a German submarine took refuge and later was escorted out of the port by Spanish torpedo-boats. By the decree submarines of all belligerent powers were forbidden to navigate within Spanish territorial waters or to enter Spanish ports. It was declared that all such submarines which entered the Spanish zone for whatever reason would be interned until the end of the war. —*N. Y. Times*, 1/8.

BRITISH TRANSPORT ASHORE.—A despatch from Halifax, N. S., dated August 2 read as follows: "Announcement was made, August 2, that a steamer, with 546 wounded soldiers on board, had stranded in the harbor mouth August 1 during a fog. The ship was steaming at nearly full speed when land was sighted, and orders to stop and full speed astern were

too late. The steamer plunged headlong on a rocky shore, the bow resting on rocks which penetrated the hull, while the stern hung in 30 feet of water.

Mine sweepers were sent to the rescue, and all of the wounded soldiers were safely transferred to the pier hospital in Halifax harbor.

Attempts made to float the steamer have proved unsuccessful. It is said that the stranded ship is in no immediate danger. The crew remained on board.—*N. Y. Times,* 3/8.

EIGHT NAVAL GUNNERS LOST.—The Department of State has been informed that the American steamer *Motano* was torpedoed without warning on July 31 at 7 p. m., sinking in one minute. The weather was moderate with a slight fog. Sixteen of the crew and eight of the naval force were lost; 17 of the crew and five of the naval force were saved. They were rescued from the water within half an hour.—*Army and Navy Register,* 11/8.

U-BOAT SUBMERGED WITH FORTY-ONE MEN ON DECK.—Thirty-eight members of the crew of the steamship *Belgian Prince* were drowned in a most deliberate manner by the German submarine which sank her, according to the account given by survivors of that British vessel who have reached British shores. The chief engineer of the steamer, who many times after the steamer was torpedoed was perilously near drowning, gave the following narrative of his experiences:

"About 8 o'clock on Tuesday evening (July 31), when we were 200 miles off land, I saw the wake of an approaching torpedo. The vessel gave a lurch as she was hit, and I was thrown to the deck among the débris. The vessel listed heavily and all of us took to the boats.

"The submarine approached and shelled the vessel and then ordered the small boats alongside the submarine. The skipper was summoned and taken inside. The others were mustered on the deck of the submarine.

"The Germans removed the lifebelts and the outer clothing of all except eight of us, smashed the lifeboats with axes, and then re-entered the submarine and closed the hatches, leaving us on deck. The submarine went about two miles and then submerged.

"I had a lifebelt. Near me was an apprentice boy of 16, shouting for help. I went to him and held him up until midnight, but he became unconscious and died of exposure. At daylight I saw the *Belgian Prince* afloat. I was picked up after 11 hours in the water by a patrol boat."

The second engineer, who also was a survivor, succeeded in reaching the *Belgian Prince* before she blew up. The Germans came on board and looted her, he reported. He was in hiding, but finally jumped into the sea and kept afloat on the wreckage.

The only other known survivor is too ill in a hospital to tell his story. —*N. Y. Times,* 4/8.

UNARMED VESSEL SINKS SUBMARINE.—The following *Associated Press* despatch dated London, August 9, appeared in *The New York Herald,* August 10:

Another unarmed merchantman has sunk a submarine, but because of the fate of Captain Charles Fryatt, of the British steamship *Brussels,* who was put to death in July, 1915, by the Germans for attempting to ram a submarine, the names of the captain and crew of the steamship and particulars concerning their achievement cannot be published. The captain and crew of the vessel have received $2500 from Sir William J. Tatem, chairman of the Tatem Steam Navigation Company, for their deed.

LINER SINKS U-BOAT.—Officers on board a steamship which reached a Canadian port August 11, tell of an encounter with a German submarine on the trip across the Atlantic, in which the undersea boat was sunk. The fight took place near the Irish coast.

The lookout notified the captain that a small sailing vessel was acting suspiciously. It was watched carefully, and soon a submarine was seen to emerge from behind it. The gunner on the steamship had his weapon ready, and directly the submarine showed itself he fired, hitting the undersea boat with his first shell. A second shot struck the conning-tower, and a third turned the submarine over and it began a nose dive. Its crew clambered on deck and waved white handkerchiefs.

The steamship wasted no time in the vicinity, but left the saving of the Germans to a patrol boat that came up.—*N. Y. Times*, 12/8.

JAPANESE MEN-OF-WAR IN THE ATLANTIC.—The following appeared under a London date line in the *New York Times*, August 12:

Additional Japanese naval units have joined the allied forces in European waters, the Japanese Naval Attaché here (London) announced August 11.

U-BOAT REPORTED SUNK OFF BREST.—The officers of a British steamship which arrived August 12 at an Atlantic port from France were confident that the gunners on their ship had destroyed a German submarine off Brest on the eastward voyage in July. Three shots were fired from the 4-inch gun at the stern, and it was believed that all of them hit the mark and sent the U-boat to the bottom of the Bay of Biscay.

The first shell struck the periscope of the submarine, the second hit her below the forward conning-tower, and the last shot, which was succeeded by a loud explosion, struck the undersea craft squarely amidships, and that was her finish, the officers of the freighter said.—*N. Y. Times*, 13/8.

U. S. GUN CREW HELD BY GERMANS.—The Navy Department, August 12, announced that it had received word in connection with its report of the sinking by a German submarine of the Standard Oil tanker *Campana*, flying the American flag, that the merchant captain and four members of the armed guard on the vessel probably were taken prisoners by the submarine.

Coming on the heels of the reports of brutality in the treatment of Americans of the British steamer *British Prince*, who were drowned after surrendering, by being placed on the back of the submarine, which submerged, leaving the helpless crew of the torpedoed craft on the submarine's deck to perish, the reports of the capture of the American armed guard are viewed with very grave concern by American officials. The further probability was considered that if the merchant captain was taken to a German port, along with the four members of the guard, the German naval authorities might undertake to execute them as was done in the case of Captain Charles Fryatt of the British steamer *Brussels*, who was put to death more than a year ago after summary condemnation before a German naval court. Captain Fryatt was executed because it was alleged that he rammed a German submarine.

Germany has from time to time not only uttered its protest against the arming of merchant vessels, but German newspapers have announced it to be the intention of the German Government to execute members of naval crews on such vessels. Whether Germany would be brutal enough to accord to American naval men, when taken prisoners, treatment other than that to which they are entitled under the laws of civilized warfare remains to be determined.

The United States Government will insist that any of its citizens or members of its armed guards captured be treated according to the laws governing prisoners of war.—*N. Y. Times*, 13/8.

ACTION BETWEEN LINER AND U-BOAT.—The first account of an attack made by a German submarine on an American steamship off the coast of Ireland on July 31, which lasted half an hour without either vessel being damaged, was received August 12.

After firing a torpedo, which passed close under the liner's stern, the U-boat opened fire with her deck gun at 1500 yards, which was returned by the guns on the American ship until between 25 and 30 shots had been exchanged.

The fight occurred at 10 o'clock in the morning, when the steamship, with 750 passengers and mail, was 100 miles off the coast of Ireland bound for a port in England. Suddenly the officers on the bridge sighted a periscope bobbing up on the port quarter. The sea was calm, there was very little wind, and the weather was clear.

Almost at the same time, the U-boat fired a torpedo, which went within 25 feet of the liner's stern. The gun crew manned the after gun and opened fire as the liner swung to get her forward port gun into action. The submarine emerged sufficiently to fire her two bow guns, and the shells came thick and fast. The booming of the guns had brought all the passengers on deck with their life belts on, and the ship's crew stood by to lower away the boats. Although the range was not over 1500 yards, according to eye witnesses on board, the German gunners could not hit the liner. Their shots passed over the vessel forward and aft, missing the funnels and the bridge, and others fell short in the water. Shots from the steamship fell over and all around the U-boat, but did not strike the undersea craft.

During this time the passengers were greatly excited. The captain on the bridge remained cool, and kept zigzagging his ship at a speed of 19 knots, so that all her guns were brought into action, and what, with dodging the shells and trying not to afford a mark to the American gunners, the submarine gunners could not get a chance for a broadside shot. After the fight had lasted for half an hour, smoke was seen on the horizon in the direction of the Irish coast, and the U-boat fired one last shell from her port bow gun and disappeared beneath the waves as an American destroyer came up at a 30-knot speed.—*N. Y. Times*, 13/8.

PACIFIC

EXPLOSION ABOARD U. S. S. "A-7."—A disastrous explosion occurred on the U. S. submarine *A-7* at Cavite, P. I., on July 24, 1917. An official dispatch to the Navy Department announces that five men were killed and three were injured.—*Army and Navy Journal*, 28/7.

NORTH SEA AND CHANNEL

BRITISH NAVAL AIR RAIDS IN BELGIUM.—On the night of July 2-3 bombing raids were carried out on Bruges Docks and on Lichtervelde ammunition depots by royal naval air service machines.

Several tons of bombs were dropped in Belgium by the royal naval air service machines on the night of July 11-12. A fire was caused near Ostend electric power station; a heavy explosion, followed by an intense conflagration, was caused at Varssenaere railway dump, and bombs were dropped on Ghistelles and on a train near St. Denis Westrem.

Raids were made on the night of July 12-13 by royal naval air service machines on the enemy's aerodromes at Aertrycke, Houttave-Nieumunster and Ghistelles; on the railway junction north of Thourout Station, on Bruges dock and canal bank dumps, and on the railway junction south of Ostend Harbor. A bombing attack was also made on the Solway Works, Zeebrugge, and root of Zeebrugge Mole.

On the night of July 15-16 several tons of bombs were dropped by the royal naval air service on the following military objectives: Solway Works, Zeebrugge; railway junctions and sidings at Ostend; railway sidings and dumps at Middelkerke; railway junction at Thourout; and motor transport convoys and railway sidings at Lichtervelde. All our machines returned safely.—*The Army and Navy Gazette*, 21/7.

GERMAN MERCHANTMEN CAPTURED.—The allegation of Dutch newspapers that part of the encounter on Monday, July 16, between British destroyers and German merchantmen, which were attempting to run the blockade from Rotterdam, occurred in Dutch territorial waters is generally discredited in London naval circles. The only reports thus far received at the Admiralty come from commanders of British forces in the action in the form of wireless summaries, the substance of which was covered in official statement. The complete reports, when received, are expected to clear up the situation satisfactorily.

It is explained that the shoals along the Dutch coast in this district extend so far to sea that it is necessary for ships to steer a course well outside the territorial limits. The attack is said to have occurred at a point more than four miles from shore.

It will be a source of great satisfaction in all the allied countries if this coup succeeds in putting a halt to the traffic between the Rhine and Hamburg, which has been increasing in recent weeks, with greater boldness on the part of the German captains. The British withheld their stroke until the largest flotilla thus far sent by this route was well on its way, and then dealt a quick, hard blow.

Already it has been announced from Rotterdam that Germany has decided to lay up 30 coal steamers there instead of attempting to run them home through the sea lane.

Reporting officially the capture of the German steamships the British Admiralty statement says:

"Some of our light forces whilst patrolling the North Sea about 4.30 a. m., July 16, sighted a number of German steamers ahead. The signal to stop and abandon ship was hoisted, and shots were fired across their bows to emphasize the order. The order was disregarded, and all the enemy ships made for the Dutch coast. Two of the rearmost reached shore, having been badly damaged by our gun-fire. The other four ships were, however, intercepted and captured by our destroyers, who placed prize crews on board and brought them away under their own steam. On two of these ships the crews abandoned their ships. The other two crews were brought back into harbor prisoners. All four ships are now in harbor in this country. Their names are *Pellworm, Brietzig, Marie Horn*, and *Heinz Blumberg*."—*N. Y. Times*, 19/7.

FRENCH SAILING SHIP SINKS SUBMARINE.—The crew of the French sailing ship *Hyacinthe Dyvonne* has been presented with the sum of £1000 by the Ministry of Marine for sinking a German submarine.—*The Army and Navy Gazette*, 21/7.

AIR ENGAGEMENT.—On July 11 a patrol of five royal naval air service machines met and engaged ten Albatross scouts and three large two-seater machines off Nieuport. Five of the enemy machines were accounted for, with the loss of one of our machines.—*The Army and Navy Gazette*, 21/7.

BRITISH SUBMARINE SUNK BY U-BOAT.—The British submarine *C-34* has been sunk by a submarine, it was officially announced July 25. The sole survivor was taken prisoner.

British submarine *C-34* was built in 1909, one of eight craft of identical design. She was a boat of 313 tons and a maximum draft of 12 feet, with a speed of 14 knots above water and of 10 knots submerged. She was equipped with two torpedo tubes. Her normal complement was 16 men.—*N. Y. Herald*, 26/7.

U-BOAT CAPTURED.—A German submarine was destroyed on July 26 on the French coast west of Calais. The undersea boat went ashore and the crew, unable to free her, opened the gasoline tanks and set fire to the vessel.

The members of the crew reached the shore, where they were made prisoners.—*N. Y. Times*, 28/7.

The German submarine that ran ashore on the French coast west of Calais on July 26 was not destroyed when its crew set fire to the gasoline tank, but was captured by a troop of Belgian cavalry, according to a dispatch from Calais July 28.

The stranded submarine was first sighted by a customs officer. He called upon some Belgian horsemen who were exercising nearby to come to his help. They rode down to the beach, the message reports, surrounded the U-boat and made prisoners of the crew, while the astonished countryside watched the accomplishment of the feat.—*N. Y. Times*, 29/7.

GERMAN AIR RAID JULY 22.—German airmen made another raid in daylight over the east coast of England on the morning of July 22. About 20 German airplanes took part and were repulsed after they had dropped several bombs over Felixstowe and Harwick. The total casualties, according to an official statement, numbered 11 killed and 26 injured. The damage to property was insignificant. A patrol of the Royal Flying Corps encountered some hostile machines returning to Belgium and brought down one at sea near the coast, says the British statement. The German report states that all their airmen returned safely.—*The Army and Navy Journal*, 28/7.

BRITISH CRUISER "ARIADNE" SUNK.—The British cruiser *Ariadne*, of 11,000 tons, has been torpedoed and sunk, according to an official statement issued July 30 by the British Admiralty.

Thirty-eight members of the *Ariadne's* crew were killed by the explosion. All the other sailors were saved.

The *Ariadne* was an old British cruiser, having been built in 1898. She was 450 feet long, 69 feet beam and had a maximum draft of 27½ feet. Her complement consisted of 677 officers and men.

The *Ariadne* carried sixteen 6-inch guns, twelve 12-pounders and a number of smaller guns. She also was equipped with two submerged 18-inch torpedo tubes.—*N. Y. Herald*, 31/7.

DUTCH FIRE ON GERMAN SEAPLANE.—A dispatch to the *Times* (London) from Rotterdam says a German seaplane alighted at Texel, Holland, August 6, after being fired at by Dutch soldiers. It was short of gasoline. The occupants were interned.—*N. Y. Herald*, 8/8.

"U-30" TAKES REFUGE IN DUTCH PORT.—The German submarine *U-30*, accompanied by two Dutch torpedo-boats, entered the waterway of the Netherlands fishing town of Maassluis August 7, 10 miles west of Rotterdam, according to a dispatch to the *Handelsblad*. It is understood that the U-boat merely is awaiting better weather.—*N. Y. Herald*, 8/8.

GERMAN AIR RAID OF AUGUST 12.—Two of the German machines which on August 12 raided the English southeast coast watering places were destroyed by British naval aeroplanes. The official statement issued by the

government August 13 says that one of the machines was a Gotha aeroplane and the other a seaplane. The text of the statement issued by the British Admiralty said:

"One hostile aeroplane of the Gotha type was destroyed during the return of the raiders to the Belgian coast and one hostile seaplane was destroyed off the coast of Flanders at approximately the same time. A large number of naval machines engaged the other raiders over the sea without decisive result.

"The pilot who destroyed the Gotha, and who was flying in a land machine, reports that he first pursued an enemy aeroplane flying at 12,000 feet from North Foreland to about 15 miles off Zeebrugge, where he lost the hostile aircraft.

"Returning to the mouth of the Thames, he observed anti-aircraft fire bursting in the vicinity of Southend, and he flew in that direction. He then observed eight Gotha aeroplanes followed by four British machines steering northeast. The enemy machines were about 2000 feet above him when he got beneath them. He pursued, climbing to 18,000 feet, and attacked without result when about 30 miles out to seaward.

"At this moment he saw a single hostile machine 4000 feet below the enemy formation but flying with it. He attacked from the front and drove the enemy down to the water, where he observed him turn over and saw one of the occupants hanging on the tail. He thereupon threw him his life belt and did two or three circuits round him before returning to England. While returning he endeavored to communicate the position of the hostile machine to British destroyers."

Another official statement issued August 13 says:

"The report of our pilots shows conclusively that the enemy aircraft formation which attacked the eastern counties yesterday was making for London. On sighting the large number of our aeroplanes which were sent up against them they turned abruptly and made their way out to sea again, dropping some bombs on Southend and unloading the rest when out at sea.

"The action of our anti-aircraft guns was of great assistance to our fighting squadrons."—*N. Y. Herald,* 14/8.

PRUSSIAN AIRMEN INTERNED IN HOLLAND.—A German aeroplane with two occupants landed August 12 at Oostburg, a Dutch town near the Belgian border, 15 miles northeast of Bruges. The occupants of the machine were interned.—*N. Y. Herald,* 14/8.

BERLIN OFFICIAL STATEMENT.—An official statement issued by the German War Office August 13, says that of the Teuton aeroplanes which bombarded Southend and Margate, the southeast coast resorts of England, on Sunday, one is missing.—*N. Y. Herald,* 14/8.

GERMANS INVADE NEUTRAL WATERS.—Popular indignation in Christiania against German attacks on vessels in the Norwegian coast trade has again been aroused by the case of the steamer *Thorum,* whose officers, pilot, and crew testified in the Naval Court that they were inside the 3-mile limit of the Norwegian coast when seized as a prize by a German submarine last May. The steamer recently was released by the German naval authorities and has returned to a Norwegian port.

The Christiania newspapers severely criticize the government for accepting the German note on the incident, which offers neither apology nor compensation for the limit lost while the *Thorum* was held in a German port. It is expected that the incident will be brought up by interpellation in the Storthing.—*N. Y. Times,* 12/8.

LONDON'S AIR RAID LOSSES.—Since the beginning of hostilities, 366 persons have been killed and 1092 injured by air raids in the London

metropolitan area, according to a statement by Sir George Cave, the Home Secretary, in the House of Commons July 30.

During the same period, the Secretary said, 2412 persons had been killed and 7863 injured in ordinary street accidents in the same territory. —*N. Y. Times*, 31/7.

DUTCH COAL SUPPLY CUT OFF.—The one great preoccupation of Holland at present is its grain and coal supply for the coming winter. For the one she is dependent upon America, and for the other upon Germany, so that the news published August 4 that the coal agreement with Germany lapsed July 31, and that no coal will be forthcoming until new contracts are signed, caused alarm throughout the country.

Recent rumors that importations of coal have been suspended have been systematically denied, but the truth is now published, and the Dutch public knows that it has been hoodwinked. People had been led to believe that after the delivery of much-needed potatoes to Germany—an accommodation which forced the Dutch to eat rice for several weeks instead of potatoes—the delivery of coal would be continued until winter. These potatoes, which at present are an important food item in Holland, were sacrificed in order to help Germany over her worst food crisis before the new harvest was ready, and it is now reported that Germany has not even fulfilled her coal contracts up to the end of July.—*N. Y. Times*, 5/8.

MERCHANT CRUISER "OTWAY" SUNK.—H. M. armed mercantile cruiser *Otway* was torpedoed on July 22 and subsequently sank. Ten men were killed by the explosion. All the officers and remainder of ship's company were saved.—*The Army and Navy Gazette*, 28/7.

BRITISH DESTROYER SUNK.—A British destroyer has been sunk by a mine in the North Sea. The captain, two officers and 43 men were saved.—*N. Y. Herald*, 15/8.

U-BOAT RAMMED.—A German submarine of the largest and latest type has been towed into Zeebrugge, Belgium, by two torpedo-boats, according to an *Exchange Telegraph* dispatch from Amsterdam.

The submarine is reported to have been rammed in the North Sea and damaged severely, resulting in the loss of three of the crew.—*Washington Post*, 17/8.

BALTIC

RUSSIAN DESTROYER SUNK BY SUBMARINE.—It is reported from Petrograd that the Russian destroyer *Lovky* recently sank an enemy submarine after a severe fight. The submarine was discovered by a seaplane, which communicated the information to the destroyer.—*The Army and Navy Gazette*, 28/7.

RUSSIAN DESTROYER SUNK BY MINE.—The Russian torpedo-boat destroyer *Lieutenant Bourakoff*, has been sunk by a German mine in the Baltic Sea near the Aland Archipelago. It was following a squadron of destroyers on one of which was Lieutenant Lebedoeff, Minister of Marine. —*The Baltimore News*, 17/8.

MEDITERRANEAN

JAPANESE DESTROYER HITS SUBMARINE.—One of the Japanese naval vessels in the Mediterreanean smashed the periscope of an enemy submarine July 22, and in an attack which followed undoubtedly destroyed the undersea boat, according to a report issued July 28 by the Japanese naval attaché in London.

Japanese naval forces were escorting British transports when the hostile submarine was sighted. While one unit of the force protected the transports on one side, the other vessel attacked the submarine, fired on it and smashed the periscope. The vessel then pursued the submarine and again attacked it, apparently with success.—*N. Y. Times,* 29/7.

U-BOAT SUNK BY CANADIAN STEAMER.—The Canadian freight steamship *Meaford* sank a submarine by gun-fire in the Mediterranean on June 12, according to official information from the Marine Department in London.

The steamship, says the account, had been pursued by the underwater craft and the gun crew of the freighter opened fire while the submarine was maneuvering for position from which to discharge a torpedo.

The *Meaford,* commanded by Captain C. Dusting and under charter to the French Government, was on the way from Swansea to Bona, Algeria, when the battle occurred.—*N. Y. Times,* 17/7.

ENTENTE BOMBARDMENTS.—Entente allied warships since August 9 have been bombarding the Turkish batteries along the coast of Asia Minor, according to a despatch from Athens to the Exchange Telegraph Company.

British monitors have silenced one of the Turkish batteries and destroyed an aerodrome installed near another.—*N. Y. Herald,* 11/8.

ADRIATIC

ENGAGEMENT BETWEEN BRITISH DRIFTERS AND AUSTRIAN CRUISERS.—An attack by three Austrian cruisers on a line of British drifters employed in guarding anti-submarine nets in the straits of Otranto on May 15 is described in a London dispatch to Reuter's Limited Ottawa Agency. The account of the engagement follows:

"The drifters, in eight divisions of about six boats each, were formed along a line running roughly east and west. Each carried a crew of 10 men and one small gun. In one case the enemy appears to have acted with chivalry toward the little craft, signaling by means of blasts of the siren and by dipping the flag that the crews must abandon their vessels. This cruiser approached to within 100 yards of the *Gowanlea* and ordered her crew to take to the boats.

"Skipper J. Watt, shipping the nets, replied by ordering full speed ahead, and calling on the crew for three cheers, commanded them to fight to a finish. They manned the gun and fired with good effect until a shot from the cruiser disabled the gun. They hung on under heavy fire, endeavoring to repair the damage, until the cruiser passed out of range.

"The *Gowanlea* then proceeded to the assistance of the badly damaged *Leondia,* which had four men killed and three wounded, but whose skipper, though three times wounded, remained at his post throughout the action. Meanwhile the remaining cruisers had opened a devastating fire on the center of the line.

"The crew of the *Admirable* only abandoned their vessel after her boiler exploded and her whole house had been shot away. Even then A. Gordon, a second hand, scrambed back on board with the evident intention of firing the gun single-handed, but was killed.

"The *Girl Rose, Cora T. Haven,* and *Selby* were not abandoned by their crews until they foundered under them. The crew of the sinking *Taits* on taking to the boats discovered one of their number to be missing. They returned to the vessel through a heavy fire to search for their shipmate. Second hand Joseph Hendry of the *Serena* remained on board until the ship sank, rather than be taken prisoner. He was picked up an hour later. The crews of the *Garrigill, Bonespoir, Christmas Day,* and *British Crown* refused to leave their vessels, even when outranged and under broadside fire from the enemy, and brought them through the action.

"The enemy displayed an anxiety to destroy the wireless telegraphy of the drifter in each group. The wireless operator of the *Leondia* was found dead in his chair at the conclusion of the action, having collapsed over the wireless log in which he was writing at the moment of his death.

The British Admiralty on May 18 announced that 14 drifters had been sunk in a raid by Austrian cruisers in the Adriatic Sea, and that the British cruiser *Dartmouth* was torpedoes in a subsequent engagement, but reached port safely.—*N. Y. Times*, 28/7.

U. S. ARMY NOTES

MECHANICS AND MATHEMATICS OF THE DRAFT.—The following article by C. H. Claudy appeared in the *Scientific American*, August 4:

The United States, with the strictest of laws against lotteries or contests of any sort in which the element of luck plays a part in the securing of a prize, has just completed the greatest lottery drawing ever attempted. The prizes were not monetary, but the call to the colors, or the possibility of not being called (according to individual viewpoint!) and the "game of chance" was specifically authorized in law.

No lottery for monetary gain, in old world or Louisiana state lottery, was ever simpler in mechanism, or more hedged about with precautions to insure absolute fairness.

Ten thousand five hundred numbers were drawn, which means that every registered man had one chance in 10,500 of being called first, one chance in 10,499 of being called second, if not called first, one chance in 10,498 of being called third, if not called earlier, etc. Inasmuch as the 4557 registration districts had different numbers of registrants, any one single draft number might skip registrants in small districts. Thus, a district with 257 registrants only was not called upon by the first number drawn (258), but the chance, as a chance, remained the same—one in 10,499—that a given man from that district be named second.

There has been some comment that inasmuch as the total number of numbers drawn exceeded the greatest registration in the largest district, the drawing was not strictly proportioned by chances to the number of men registered. That this is an erroneous statement, a moment's thought will show. Had there been 21,000 numbers, instead of 10,500 the result would have been the same, the numbers above the highest number of registrants merely being discarded and having no effect on the lottery as such.

The precautions taken to make the drawing absolutely a matter of chance were such as can give the most rabid anticonscriptionist no points on which to hang an argument. The numbers, in red, on white paper, black on the other side, were rolled black side out, and inserted in gelatin capsules like the familiar 5-grain quinine dose of household use. It was impossible upon the closest scrutiny to read the number inside the capsule. All the capsules were alike. But while a searchlight might have been turned on the glass bowl holding the 10,500 capsules and the most eager and interested man allowed to pick by sight, without in any way affecting his ability to determine one number from another, only blindfolded men were permitted to draw. The mass of capsules was stirred constantly with a spoon, and so thoroughly were they mixed that, throughout the drawing, two consecutive numbers were in no case drawn one after the other.

Different numbers drew different numbers of men. Thus, for instance, numbers one, two and three, etc., drew in each case 4557 men for service —or for summons for examination—since no registration district but had its numbers one, two and three. But the higher numbers drew less and less men, as they were nearer and nearer to the top figure. For instance, in the capital of the nation there were 11 registration districts. The smallest registration in any was 1642. Any number from 1 to 1642 drew one man from each of the 11 districts in Washington. Up to 1927, the next smallest number registered, any drawn number called 10 men, up to

2590 called nine men, and so on up to 3704 and below 3721, which numbers called but one man from Washington.

On a larger scale, this happened all over the country. In other words, each number represented a group of men, the members of which are scattered all over the country, these groups varying in size. Each drawn number summoned a group but, regardless of the size of the group, one group was exactly as liable to be called first, or last, as any other group.

As the numbers were drawn by a blindfolded man, the capsule was broken, the number read aloud, checked, entered on lists and written on a blackboard. Had every man in the drawing been intent upon avoiding some one number, it would still have been impossible. The blackboard with numbers listed in the order in which they were drawn, held 1000, and it was photographed after each filling. Chicanery, trickery, influence, pull, graft—they were all helpless before the utter simplicity and the absolute inexorability of this simplest of lotteries.

SECRETARY OF WAR BAKER DRAWING THE FIRST CAPSULE, CONTAINING NUMBER 258, FROM THE BIG BOWL

In spite, however, of the utmost precautions in preparing the capsules, there was one error. The 10,004th capsule drawn had no number in it. Later it was ascertained by checking that this missing number would have called all men numbered 4664.

At the time the blank was drawn, it was hastily decided to make the 10,005th drawing fill the 10,004th place, which made the total drawn from 10,499 instead of 10,500. The manifest, if theoretical, unfairness of this, later became apparent and 4664, when it came to light as the missing number, was promptly inserted in the 10,004th place, where it belonged. Practically, the matter is of no importance, since men called so late in the draft will in all human probability never be summoned to the colors. But the principle is the same, and had the blank number come out, for instance, on the 500th draw, and not been inserted in its proper place, but eliminated entirely, all these men listed by that number would actually never really have been in the draw at all.

No one knows how the error occurred, nor does it matter now, nor has it the slightest effect upon the absolute accuracy of the draft.

That errors were so few is a matter of wonder, yet also one of congratulation, because, when matters of life and death hang upon gelatine capsules in a glass bowl, it is well that the American spirit of absolute fair play be fully satisfied.

Another little difficulty presented itself in the case of 6689 and 6899. Upside down, either one becomes the other. Both were recorded as the same number, though widely apart in the drawing. It was ruled that the first number of these two recorded was correctly recorded, the second one being the true other of the pair. Like the case of 4664 the matter is more theoretical than practical.

A complete system of checks and rechecks was resorted to before the final sheets were made up to send out. The tally sheets as recorded by the tally markers and the blackboards were compared in order that there might be no errors. The final master sheets, 11 to a set (10 of 1000 numbers, numbered in order and one of 500, numbered in order), have been printed and sent to each registration district, where the matter of calling the quota demanded in the first draft will be attended to.

There were a few oddities in the draft worthy of mention. Number 2, the 10,312th number drawn, was drawn exactly at two o'clock in the morning. Number 13 refused to live up to its usual reputation and was not drawn at 13 minutes to or after any hour. Of course, it was drawn on Friday but—so were all the other numbers.

Number 258, the first number drawn, and to some men, therefore the unluckiest number of all, is, curiously enough, the room number of that chamber in the municipal building in New York, in which marriages are performed, and in which hundreds of young men accused of being "marriage slackers" have recently taken unto themselves wives. The authorities of the marriage license bureau are pointing this out to would-be slackers as an omen!

As a result of the drawing every registered man in the country is given a definite place in the liability for service list. Already 687,000 have been ordered to the colors to fill to war strength the regular army and national guard and to constitute the first increment of the national army. To secure that total, 1,374,000 men will be called for examination within a few weeks, estimating that two registrants must be called for every soldier accepted. These 1,374,000 will be taken from the head of the liability list, every local district furnishing a fixed quota.

No further drawings will be necessary as long as any eligible registrant is not under training. Only in the event that a new registration calling men between the ages of 31 and some higher age is required, will another lottery like this one ever be needed.

Some little question has been raised as to why capsules, instead of a wheel were used. The answer is simple. A wheel can get out of order. A draft of air can affect it. A charge, no matter how baseless, could be made that it was tampered with, "fixed" and therefore unfair. The most astute lawyer, the most unscrupulous disturber, could not produce an argument worthy of a moment's attention that anything but absolute chance governed the order in which the numbers were picked from the glass bowl, or even point out a possible way in which this draft could be considered in any way less than absolutely fair.

STRENGTH OF THE NATIONAL GUARD IN FEDERAL SERVICE.—The Militia Bureau of the War Department announces that the war strength of all national guard organizations to be drafted into the federal service is 13,093 officers and 419,834 enlisted men.

Just how many the actual numbers drafted in will fall short of this will not be known until reports of the department commanders have been received. Department commanders have been directed to report the numbers actually drafted into the United States service in their several departments. The difference between the number of enlisted men given, 419,834, and the number drafted in, as shown by the reports when received, will be supplied from the draft for the national army.—*Official Bulletin*, 8/8.

ARMY ORGANIZATION CHANGED.—A general order made public by the adjutant general's office provides for important changes in the organization of the army.

The ratio of artillery strength to infantry is greatly increased. A division will hereafter include only four infantry regiments in two brigades in place of the old division of three brigades each comprising three regiments of infantry. There will still be three regiments of field artillery in each division. Thus in the new organization there will be three regiments of field artillery to every four regiments of infantry, instead of the ratio of three to nine. In addition, a trench motar battery is attached to each division.

The machine gun arm is also materially enlarged. A machine gun battalion of four companies has been made a unit of each division, in addition to the three machine gun companies included in each regiment.

The American division will be made by this order to conform practically to the units utilized by the entente allies, among whom a division numbers approximately 19,000 men. The reason for the change is that the division as heretofore made up of about 28,000 men is too unwieldy for the demands of trench warfare. With so large a unit, sure and swift communication with all parts is difficult. The problem to be met was basically one of mobility for the peculiar needs of fighting on the western front.

The smaller-sized divisions call for maintenance of all units at full fighting strength. For this purpose reserve battalions will be provided. These will consist of 612 men each and are listed in the general order as "separate training battalions." The number of these battalions has not been made public. Details of regimental organization are also withheld for military reasons.

The new order provides for army corps and armies units which have practically existed only on paper since the Civil war. Corps were organized during the Spanish war, but were not actually operated as such to any great extent.

Each army corps will consist of three infantry divisions, corps headquarters, and certain army corps troops not specified. Each army will normally consist of three or more army corps, army headquarters, and certain army troops not specified.

Under the new order, each infantry division will be composed as follows, the changes from the present organization being as indicated: One division headquarters (same as at present); one machine-gun battalion of four companies (new); two infantry brigades of two regiments and one machine-gun battalion (four companies) each. (The present division is three infantry brigades of three regiments each); one field artillery brigade of three regiments and one trench mortar battery (same, except trench mortar battery is new); one field signal battalion (same); one train headquarters and military police (same); one supply train (same); one engineer train (same, except that pontoon and searchlight sections are not included in new plan); one sanitary train of four field hospital companies and four ambulance companies (same).

The new organization provides for no cavalry in the division. The division as at present constituted calls for one regiment of cavalry. The present division also calls for one aero squadron, while the new plan calls for none, the aircraft units being otherwise provided for.

The order specifies 16 divisions of the national army to be organized and numbered from 76 to 91, both inclusive, and states the numbers to be given to each of the different units in each division. It provides that the 16 divisions of the national guard now organized shall be reorganized to conform to the new plan as soon as practicable after their arrival in the training camp.

The regular army, the national guard, and the national army will all conform to the same plan.—*Army and Navy Register*, 11/8.

NEW GENERAL OFFICERS.—It was announced in the press August 14, that the President had sent to the Senate the names of 184 officers whom he had appointed as temporary general officers in the national army. Thirty-seven of them are to be major generals and the remaining 147 will be brigadier generals. The appointments are for the period of the war.

Commenting editorially the *New York Herald* said:

"The country has reason to congratulate itself that in the President's selection of higher commanding officers for the new army there can be no suggestion of political favoritism. The promotion of officers of the regular army to be major generals and brigadier generals assures to the men who are to serve in the ranks the best leadership and, in consequence, the best training that the United States can provide. Moreover, the selection of general officers from the national guard commands is without taint of politics. Most if not all of the men chosen from the states have had long experience with the state organizations, and it can be assumed that they have shown themselves officers of merit.

"While some will prove more capable than others, the material taken as a whole is the best the country affords."

GENERAL

TETANUS GERMS IN STICKING PLASTER.—The Department of Justice July 28 authorized the following statement relative to its investigation of sales of poison plasters in various sections of the United States.

"The Department of Justice, without sharing in any sensational view as to the manner in which sticking plaster or courtplaster became infected, states that some of the samples submitted and analyzed have been thereby shown to contain tetanus germs. The public is consequently cautioned against purchasing this remedy except from approved sources, the warning being particularly directed against purchases in small packages from street peddlers and venders.

"The samples of sticking plaster mentioned by Secretary of Commerce Redfield under date line of yesterday were received at the department this morning. These samples will be analyzed immediately."—*N. Y. Times*, 29/7.

BRITISH OFFICERS' CASUALTIES.—An analysis of the casualty lists has always a considerable interest attaching to it, albeit of necessity it cannot fail to be a sad one. The totals returned for May are undeniably high; but such is the inevitable result of extra activity on any front. The official figures show altogether 6168 officers, of whom 177 were in the senior service, and 109,422 other ranks, 2347 being naval. We are, of course, uninformed as to the real incidence of the "wounded" returns, for of the total of 80,865 officers and men thus described, it is not publicly notified how many have been able to resume duty since they were hit. If the months of April and May be taken as a whole, we find the casualties' gross totals to be 10,372 officers, and 138,694 other ranks. An approximate proportion, therefore, is obviously one officer to 13 men. Regarded on this basis it is evident that the officer casualties are excessive, and it is to be presumed that inquiry is being made into the matter. In the Russo-Japanese war we believe we are correct in saying that the proportion of losses was one officer to 36 men, a very marked difference from that indicated in our own latest returns. The undue loss of officers is of grave importance, for as Major Redway says in an evening contemporary, "in order to replace 1000 officers 1000 picked men have to be taken from various units and sent to the rear for a course of training, so that the army is depleted for the moment of 2000 fighting men of the highest quality. This process long-continued must bring operations to a standstill." There

can be but little doubt that our enemy must experience a somewhat similar difficulty; but after all that is only the more reason why we should at once take measures to secure that, pitting one against the other, the advantage will lie with us.—*United Service Gazette*, 14/6.

BRITISH CAPTURES, ON THE WESTERN FRONT.—Mr. Macpherson stated in the House of Commons on June 15, in reply to Brigadier General Page-Croft, that the total number of guns captured on the Western Front since July 1, 1916, by the British armies was 434. Since the beginning of the war until the end of May the British armies had captured altogether 76,067 prisoners on the Western Front, to which must be added at least 8000 for June.

In Mesopotamia approximately 10,900 prisoners had been taken since July 1, 1916; 132 guns had been captured since the beginning of the war, exclusive of the guns lost at Kut and recaptured by us.

The captures reported by the General Officer Commanding in Egypt since July 1, 1916, were approximately 8739 prisoners and 18 guns.

In a fortnight's time he hoped to give the exact figures up till the middle of June.

About 600 square miles had been regained on the Western Front since July 1, 1916, by British troops. This figure must be taken as approximate only, as the boundary between the French and British armies had varied constantly.—*United Service Gazette*, 28/6.

BRITISH NAVAL OPERATIONS IN CENTRAL AFRICA.—The letters printed below, dealing with a phase of the war that is scarcely heard about in the swift succession of major events, were written by a British naval officer attached to the expedition that swept the Germans from Lake Tanganyika, in Africa, after overcoming obstacles that seemed at first to be beyond human powers.

Lake Tanganyika, Nov. 3, 1915.

We have arrived at last, and it has been a very tiring task for all of us. The conditions were simply awful. For days we drank filthy mud—not water—and a bath was an impossibility. We had little sleep; were worn out with sun, dust, flies, and mosquitos, and our hearts at times nearly failed us with the overwhelming difficulties we had to contend with. The dust from the oxen and traction engines, in combination with a merciless sun, and then 16 days on the Lualaba River in an open boat through a sleeping-sickness country, infested with tsetse, was an experience none of us wishes to have again. At times, when I was responsible for the safety of my boat and saw her at one moment sliding in loose earth toward a precipice, and at another with one wheel right down in an ant-bear hole, one's feelings can be better imagined than described.

What has been done constitutes, I think, a record. We have taken *Mimi* and *Toutou* (boats) over 10,000 miles by sea and rail—200 miles through bush and forest, 400 miles by river, and again 100 miles by road. The road we took went right over a plateau 7000 feet above sea level, so soft that the wheels were buried and we had to haul our gear out with block and tackle, oxen and niggers. The river journey was also very difficult, owing to the sand banks, and the last portion was so shallow that we had to put our boats on shallow-draft barges—not an easy task. According to the Belgians, we have accomplished the impossible.

However, there were compensations.

We have seen a good deal of Central Africa and have had some big-game shooting down the river, crocodiles, hippos, buffalo, buck and two elephants being the victims. It will be an experience we shall all look back upon with a certain amount of pride and satisfaction, but we are happy to have reached the lake.

Four of our men are down with fever, but, apart from that and a general leanness, we are pretty fit.

Our operations on the lake will commence as soon as possible. We have a very difficult task in front of us, but for the honor of our country we are determined to give a good account of ourselves.

Lukuga, Dec. 10, 1915.

So far we've seen nothing of the enemy, but it is hard, nerve-racking work; out all times of the night, expecting to run into a mine field or a tornado, but no opportunity yet of a fight. "Doc." is busy rigging up an operating table, and the happy, expectant look on his face is a treat to see. He insists on carving all joints and birds in order to keep his "hand in"; but, by the way he hacks a joint and tears a leg off a duck, any amputations he may have to do will be done very thoroughly. We are still short of food, or rather, the variety is limited. Breakfast usually consists of rice and tinned beef, lunch of soup, tinned beef, sweet potatoes, and bread; and, at dinner, we sometimes manage to have fish from the lake and occasionally a duck. We have no tobacco or cigarettes, milk, sugar, or jam.

December 27, 1915.

Yesterday was a day of days for us. We engaged a German gunboat of five times our combined tonnage, and, after an action lasting 12 minutes, she hauled down her flag and surrendered. She was boarded and brought home as a prize and will strengthen us considerably.

At 9 a. m., on Boxing Day, the German boat was sighted on the horizon, steaming south. All hands were ordered to the boats and we left the harbor at 9.30. The Germans were then about 6 miles from us and south of us. Being so small, she did not see us until within 5000 yards, and then she noticed the Union Jack and turned to wipe our small craft out.

We came under their fire at 3000 yards, but went for her at full speed and, at 2500, opened fire. The third shot from *Mimi* hit the wireless and brought it down. The fifth shot hit her on the water-line, and she fled, but we were faster and put shell after shell into her. She turned again and fired several rounds, but missed every time. A shell of ours went through her conning-tower and killed her captain, the gun layer, and a seaman. She was also leaking badly, and then hauled down her flag. From the time we left harbor we steamed at full speed up to her.

When we boarded, a horrible sight met us. Twelve shells had hit her, and she was yellow with lyddite, but the poor wretches who were dead were unrecognizable. We took four white prisoners and the black crew. The dead were buried with military honors in the afternoon.

The whole Congo is mad with joy over this victory. The *Kinjani* was about the best boat on the lake and well equipped for fighting. A wonderful reception awaited us on our return with the prize. The Belgians had witnessed the fight through their telescopes. They sent trains down the line to bring up all the whites and the native troops to form a guard of honor on the beach.

There were 2000 black and white soldiers with fixed bayonets, about 2000 niggers and their women. The scene with the shining sun was gorgeous—one mass of color and flashing steel. The Belgian officers tried to kiss us—some actually did. The niggers danced and rubbed sand in their hair, and a salute of 12 guns from the shore batteries was fired as the Union Jack was hoisted on the German boat.

I had the honor of taking *Mimi* into action and was at the wheel. *Toutou* was under the heaviest fire and had some very narrow escapes.

This victory means so much. All throughout the Congo the Belgians have laughed at our "toy boats," as they call them, and ridiculed the whole expedition. The toys, however, have more than justified our existence here. They have done more than the whole Belgian fleet has done in 18 months. Now we practically have command of the lake and shall be very pleased to meet any boat or boats the Germans like to send against us.

We are delighted at our success, but the Doctor regrets that there are no casualties for him to practice his "masterly inactivity" upon.

February 18, 1916.

On February 9 we sighted the *Hedwig Weissman*, a large German armed steamer, and went out to attack her with the *Kinjani*, renamed *Fifi*, and the *Mimi*. *Toutou* was laid up for repairs. The German ship came toward us, but, on seeing the British ensign, funked a fight and turned to get away. The *Kinjani* was not fast enough to overhaul, so *Mimi* went after her with orders to fire at long range and to generally worry her into a zigzag course, or to make her fight in order that the *Kinjani* could come up into range. We overhauled her and opened fire at 3500 yards, to which she replied with the stern guns. After forcing her to zigzag and lose speed, she turned her big guns on us, and by this time the *Kinjani* was able to open fire, and we were ordered to draw off. Shell after shell found its billet on the *Weissman*—our gunners were marvelous, and in 10 minutes she was on fire and sinking. We picked up 12 Germans and 9 blacks; the remainder of the crew were either killed or drowned in the ship. The prisoners we took were naval men from the *Königsberg*, which the British sunk in the Rufigi River.

We have now absolutely cleared the lake of the German gunboats—not so bad for *Mimi* and *Toutou*. One boat was captured, one sunk, and one other of 600 tons blew herself up to save being captured.

The original crowd are still intact—no casualties, thank God! We have had tremendous luck. In all our fights shells have fallen all around us, but never a hit, and on several occasions, when landing troops, we have had volleys fired at our boats, knocking splinters of wood into our faces, taking a heel off a boot, etc., but doing no harm to the crew. We are just off in *Mimi* to land a shooting trip, as we have native information that herds of buffalo are in the vicinity.

Bismarcksburg, June 17, 1916.

We have been patrolling the German coast of the lake day and night in order to prevent reinforcements being sent by lake to either the north or the south of the colony. In addition we have been supporting the left flank of the Rhodesian troops advancing from the south.

On June 12 Bismarcksburg fell into our hands and, since then, have had the pleasure of living in comfortable German houses. Bismarcksburg is quite a useful fort, surrounded by trenches, dugouts, blockhouses loopholed in three tiers, and commanding flat, open stretches of ground on three sides, with the lake forming the western boundary. We have been in touch with the Rhodesian forces and have seen the men, after tremendous forced marches in tropical heat and carrying 60 pounds of equipment. They arrived at Bismarcksburg after making 42 miles in 30 hours, and on half rations. Poor wretches! I have never seen men (not even in France) so dead beat. The route they took was over a range of hills 2000 feet high and strewn with rocks and boulders. Yet it was remarkable how cheerfully these fellows endured their hardships.

October 5, 1916.

We had an interesting and exciting time on one of the largest rivers in Central Africa. I was in charge of a barge, with stones, etc., paddled by niggers. We had an encounter with hippos. I shot one in the head as he came for us. He got right under the barge and lifted her stern almost out of the water—not bad lifting, as the barge was loaded with nearly 10 tons of gear. On the banks of the river are to be seen crocodiles, maribou, crested crane, and about every kind of tropical bird.

This has been a wonderful experience, but there is a touch of pathos in it all. One sees beautiful plantations of palms and signs of old villages which must have had large and prosperous populations at one time, but

sleeping sickness has wiped them all out. On the shore we found huge native jars of beautiful workmanship and dilapidated fortifications that were almost impenetrable. Sleeping sickness is a terrible scourge on both banks of the river.

This country is wonderfully picturesque, with the broad rivers, beautiful palms and tropical vegetation on the banks, and the beautiful birds. It is gorgeous. If one could only do away with the tsetse and mosquito it would be a white man's paradise.

Scotland, February 8, 1917.

We left Tanganyika on October 18 and, owing to the fact that the Congo was at its lowest and, therefore, not navigable, we had to trek south through Northern Rhodesia to the railhead, over 1000 miles.

Our journey took seven weeks to the railway. We walked 500 miles and did the rest by river in native canoes. The river trip was very trying, as, for 300 miles, we were in the Bangweolo swamps, with half the expedition down with malaria and no doctor.

We at last managed to reach Cape Town on December 4 and remained there until December 29, each day expecting orders for home. On the 29th we sailed on the *Briton*, a transport, together with seven other transports, and, after 36 days at sea reached the dear old country safe, but cold.—*N. Y. Times*, 5/8.

REVIEW BY A BRITISH NAVAL OFFICER.—The exact connection between the Mesopotamia muddle and the changes at the Admiralty can only be guessed at by the public. How, too, these changes will help us to get on with the war, and particularly the war at sea, must also remain an enigma to the man in the street. It was never explained clearly why Sir Edward Carson became First Lord in Mr. Lloyd George's Government, but the navy has been content to take the reason as sound, seeing that it was satisfied with Sir Edward himself. That naval administration has been in many ways more efficient since Sir Edward took the reins in hand is capable of demonstration, even if, as was said, when adjustments were made in the controller's department, Mr. Lloyd George himself handled the whip. Anyway, with the coming of Sir Edward Carson, there was also manifested a more vigorous policy, both in regard to activity at sea and the speeding up of the shipbuilding industry ashore.

It has been said, and possibly with some truth, that the choice of Sir John Jellicoe to succeed Sir Henry Jackson, had a political rather than a professional inspiration. At the time the country was getting uneasy about sea methods, it was beginning to realize the sleepiness of the Balfour *régime* at the Admiralty. There was at least some danger, from the politician's point of view, of a popular outcry for the return of Lord Fisher. As an alternative, it may have been thought better to have Lord Fisher's lieutenant; the man best acquainted with his views and best adapted to vitalize his measures. In making that appointment, the politicians digged better than they knew. It has taken some months to put vigor into the naval machine, but Sir John Jellicoe has done it, and the outcome of the changes he at once initiated, and has since carried out, are becoming increasingly apparent every day.

Sir Edward Carson's selection as First Lord, although its promise was not at once clear, has been more than justified by events. When to the combination of Sir Edward Carson and Sir John Jellicoe a long-needed reorganization of Admiralty business added Sir Eric Geddes, a further stride was made towards efficiency. With Sir John Jellicoe's professional experience and knowledge, Sir Edward Carson's courage and quick grasp of essential needs, and the fact and business capacity of Sir Eric Geddes the redistribution of work and responsibility was carried out smoothly and speedily. It seems a pity that this combination should have been broken up before sufficient time had elapsed to permit it to bring forth its fruits

in full measure. There are compensations. It may be expected that with Sir Edward Carson in the War Cabinet, fresh primed with the knowledge acquired at the Admiralty and in the fleet, there will be a better chance of naval views receiving in that august assembly the consideration and attention they merit. Personally, much regret will be felt in the service at Sir Edward's departure, but as a whole the navy will be consoled at his loss, if he carried with him to his new office a savor of the sea.

As to the choice of Sir Eric Geddes as First Lord—a move which it is not difficult to trace to the Prime Minister's masterful mind—the country will judge of it entirely by results. It may be assumed that this able reorganizer of railway and transport work will now cease to masquerade as an admiral, and by this step, trifling as it may seem, he will do a good deal towards winning the sympathy and esteem of sea officers. There can be no doubt that the new First Lord is already assured of the ungrudging support of his naval colleagues, and that the service will accord him its best wishes. That he, on his part, will realize and observe the responsibilities and obligations pertaining to his new office is equally beyond question. There still remains much to be done both to meet the menace of the submarine and to make the full use of our naval strength. In such a task the business experience of Sir Eric Geddes should find ample scope. Some of the most capable First Lords, and some who have left an indelible record of their talents upon naval life, were business men; men whose experience in trade or commerce was most valuable to them when they went to the Admiralty. Seeing that the politicians have apparently determined not to follow the successful and satisfactory precedents of former wars, but must go outside the navy for a First Lord, it is probably just as well that the choice should fall upon someone who has already made acquaintance with the Board of Admiralty; one who is already favorably known for the good work he has done as a civil administrator, and whose qualities appear to fit him admirably for his new duties.

The task before the Admiralty at the present time is epitomized in the appeal which Sir Edward Carson and Sir John Jellicoe have sent to the Iron and Steel Trades Confederation. It is to meet the menace of the submarine, upon which the enemy has staked everything. "If he succeeds, victory will rest with him; but if he fails, his defeat is certain." It is quite as well that the country should be reminded that the menace is not yet overcome, and that the artisans should be warned that in case of failure to meet it the responsibility will largely rest with them. It is not, however, upon them alone, for it cannot be forgotten that at least a part of our difficulties now are due to the mistake of those who, in the early part of the war, withdrew the trained workers from the shipyards and sent them to the trenches. Again, there seems to be just a possibility that certain phrases in the appeal are open to misconstruction. The Admiralty Lords assert that against the submarine menace there are only two weapons that can be used, and both can be forged in the shipyards of the country. Is there no use, then, in this work for the vessels of the air, and is it not practicable to burn the wasps nests instead of waiting until the baneful insects are engaged in their malevolent business? Now that Mr. Churchill is again in ministerial office perhaps more will be heard of this aspect of the matter.

The smart bit of work off the Dutch coast may be said to be connected, and not indirectly, with the undertaking to which Sir Edward Carson and Sir John Jellicoe refer in their appeal. It was an exposition of the value of the offensive in war. The more the Huns are employed in protecting themselves, the fewer will be their opportunities for concerting measures and executing plans designed to enforce a blockade upon these islands. To assert this is not to underestimate the menace of the submarine, but at least among the weapons with which the U-boats may be met, are those which operate in the air; and to ignore or to minimize this point is to miss

an essential in the struggle. With the holding up and capture of these four German merchant ships, we have a third example of the more vigorous policy which is the most marked feature of Admiralty administration since Sir John Jellicoe returned to Whitehall. The bombardments of Zeebrugge and Ostend, with the complementary work of the Harwich flotilla, was one of these instances, while the continued and consistent use of the naval airmen in Belgium is another. We have not yet got the better of the submarine, but we have more than disappointed the expectations of those who projected the campaign. That it will be met, and successfully, is beyond question, and to push the offensive with energy and vigor, will shorten the period in which this most desirable consummation will be reached.—*The Army and Navy Gazette*, 21/7.

BRITISH COMMENT UPON OUR MILITARY AID.—The following editorial appeared in *The Army and Navy Gazette*, July 7:

Just as Germany miscalculated on British intervention in August, 1914, so she has miscalculated on the intervention of the United States now that the war is entering on its later stages. Her idea was that before the United States troops could land in France submarine warfare was to starve this country into the consideration of peace terms, or so to hamper the offensive of the Anglo-French forces that it could be decisively turned. This strategical victory of submersible craft was to eventuate by May, although, for obvious reasons, it was later deferred until July or August. But in the meantime the advance guard of America's armies has landed in France. If, with the already enormous demands on allied naval and maritime resources, U-boats could not prevent its transportation without a hitch over 3000 miles of ocean, it is a rough measure of the enemy's inability to prevent America's main military aid from materializing at the critical point and at the critical period of the war. Therefore, German hopes, based on submarine warfare, are waning. American troops are fighting in France and are provided with all they require in food, munitions, arms, equipment and all the other necessaries of soldiers in the field. England is in no immediate danger of starvation, and the Anglo-French offensive is being vigorously prosecuted.

Thus, although the American contingent in France is, at present, more impressive from the moral than from the military side, it is a symbol full of high promise for the Allies. Not only has its passage across the Atlantic to its destination demonstrated to the nations, neutral and belligerent alike, the potency of surface sea power at a time when under-water craft are terrorizing shipping without distinction, but the Anglo-French armies have received a reinforcement of fine quality, to which the German high command, whose judgment where military facts are concerned is seldom wanting, would be the first to pay a tribute. For the contingent largely consists of regular troops, belonging to the "old" federal army, which is, for its size, very efficient. It is well trained and officered, and has more than a parade ground and maneuver efficiency, gained in Indian campaigns and, recently, in the Mexican operations. The men composing it are picked, and as the scale of pay is good, the standard in character is as high as the standard in physique. What is left at home of this capable little army will be required to train and leaven the vast new American levies which are being raised under the Registration Bill, which came into force at the beginning of last month.

When the Germans laughed at the military power of the United States it was for the same reason that they laughed at the military power of Britain. They did not believe that she had the capacity to expand her small regular nucleus into a national army adapted to modern conditions in a great emergency. But just as one Anglo-Saxon people has surprised the German high command, so will the other. As a matter of fact, the United States is, in one respect at least, in a better position quickly to follow up the advance guard of her army than Britain was in 1914. She has a large

frontier population, intelligent, full of initiative, resourceful, hardy, adventurous—in short, the finest raw material for soldiers. Such men, as we have proved ourselves, can readily be trained and disciplined so as to give a good account of themselves in the most trying fighting conditions. In these circumstances there is no reason why the United States should not be able to place a large force in France before the autumn. It is largely a question of organization. The quality of the new troops will bear the same relation to the contingent as the new armies bear to the "old" army of this country. Germany has already ceased to laugh at American war preparations, and August is approaching, before which a heavy blow is to be dealt the Allies through submarine warfare. She will have to be quick about it, or she will find the United States running in the race, and it will be too late. One thing is certain—the American contingent has not arrived safely in France through German mercy or for want of accurate information. The omens for further American aid to the Allies are good.

NEUTRALS AND THE EMBARGO POLICY.—Proof of the serious view taken by neutrals of the embargo policy adopted by the United States toward Germany and her allies was afforded by the sailing on the eve of the date the embargo came into force of 10 Dutch and one Scandinavian grain-laden steamers, which had been lying at Atlantic ports for weeks, unable to go to sea because the British Government had withheld the letters of assurance which would have secured them free passage to their home ports. There is no question but that the British Government's policy was due to an understanding with the United States that Washington should deal with these cargoes under the authority conferred by the Espionage Law. There are still about 30 neutral ships laden with grain lying in American waters, which will come under the terms of the Exports Licensing Board. However, there is as yet no proof that the 11 ships that slipped away last week intend to run the blockade. They may put in at Halifax for examination, in the hope that the British authorities will prove more lenient than the American, which would go far toward evidencing how seriously the neutrals view the enforcement of war measures by the United States Government. In any case, the official view in Washington is that Great Britain will consult with the State Department before taking any action respecting the runaway grain ships, provided they put in at Halifax for examination. It is not known whether the vessels sailed under orders from their respective governments or their companies. In a general way, Norway and Switzerland expect preferred treatment by the United States because they have honestly endeavored to reduce their commerce with the Central Powers to a minimum, so that there is not the same reason for close inspection and caution in dealing with them as with Holland, Sweden, and Denmark. Holland is expected to discover that the good faith of her purchases in America is questioned. There is understood to be proof of trafficking between Holland and Germany that would warrant this assumption. The measures put into operation by the Dutch Government to prevent the re-exportation of commodities imported from the United States have been easily evaded by Dutch traders and if their government is unable to curb them, it is evidently the duty of the Allies to do so. No blacklist will be issued by the United States Government because if the licensing authorities discover evidences of fraud, the firms incriminated will be denied licenses. On the other hand, very little concern is shown officially about the putting to sea of the Dutch ships, because if they succeed in running the blockade, their cargoes will be charged off against the total amount of stuffs which their governments are permitted to import by common consent of the Allies. Before the adoption of the embargo measure by the United States, the blockade situation had become more or less of a joke. Thus cattle feed would go to Denmark and Holland to fatten cattle destined to Germany, while Sweden would sell her own iron and substitute therefor imported metal from the United States. Several American firms have since the outbreak

of war been actively engaged in chartering ships on German account for the transport of foodstuffs to neutral ports and some of the cargoes thus laden are still lying in American ports. Such transactions may not weigh heavily on the conscience of those that had a hand in them. In fact some of the firms incriminated even contributed ambulances to the Allies out of the profits made in trade with Germany through neutral channels. But the entry of the United States into the war has changed all this. What were formerly questionable transactions have become treasonable, and if there be among us persons that cannot resist the temptation to make money, when the only opportunity of making it consists in feeding the barbarians that are now engaged in the task of blotting out civilization, the sooner some of these gentry are lined up before a military squad and shot, the better it will be for struggling humanity. Scores of such people were thus treated in France and Italy and it would be folly for this nation to follow the rosewater policy of England toward commercial traitors and shady neutrals. Another problem which the Allies will have to take up very soon is that of neutral ships laid up in their own harbors. When the neutrals are urgently in need of commodities, it is reasonable to insist that they should themselves provide the tonnage for transportation, ships owned in the allied countries being thus released for the transport of commodities essential to the prosecution of the war. That day another scandal will terminate, namely, the use of British and American vessels for the conveyance of goods which German firms purchase in the United States and sell at a profit in South America and the Far East.—*Shipping Illustrated*, 21/7.

THE ATTITUDE OF HOLLAND.—The Dutch are a taciturn race noted for their shrewdness in business. Little astonishment therefore, should be felt in the extraordinary proposition made by Dutch shipping interests, that idle Dutch tonnage be substituted in the Pacific trade for Japanese ships to be sent into the war zone. The coolness of such a proposition is all the more striking when it is considered that Holland obstinately refuses to fall in line with the suggestion put forward by the Allies that she stop her re-export trade with Germany in order to obtain foodstuffs from America. The Pacific scheme naturally involves the compliance of the Japanese, which may not be so easy to obtain, but failing this, the land of ducks and canals has another card to play; namely, the admission of her idle ships into the American coastwise trade to relieve the shortage of tonnage caused by the withdrawal of American ships through government requisition. Possibly Voltaire was a little hard on the Hollanders when he wrote his famous farewell to the Low Countries, but at the present juncture Holland certainly cannot expect that out of respect for academic rights, the Allies will permit a condition to obtain which the Germans would not tolerate for an hour were they to obtain the command of the seas for a single day. Since the beginning of the war Holland has been Germany's most reliable trade ally. In taking this position the Hollanders were not actuated by any tender regard for the Germans whom they cordially hate, but simply by the desire to make all the money possible out of the geographical position of their country. But there is an end to all things mortal and the entry of the United States into the war has changed that happy state of affairs which had existed since August, 1914. The burning question of the hour is the solution of the complex economic problems which are confronting the Allies and certainly this ideal cannot be reached when a large portion of the food supply which is badly needed by the Allies is permitted to go to Germany via Holland, or, what is vitually the same thing, when essential commodities are sold to Holland to replace materials sold by her to Germany. It is too late at present to take stock in neutral governments' pledges. Such pledges are too easily overridden by subordinate officials and the result is invariably the furnishing of assistance to the enemy, which retards the advent of the hour of ultimate victory. There is ample basis tor insisting on compliance by Dutch shipowners with the rules laid

down by the Allies for the distribution of tonnage. By denying Dutch ships asylum in our harbors and regulating their voyaging by means of curtailing their bunker supply, a way will soon be found to take the starch out of Dutch stiffness.—*Shipping Illustrated*, 11/8.

THE GUN AS AN ANSWER TO THE SUBMARINE.—The *Scientific American* has placed itself on record as believing that the only effective means of meeting and defeating the German submarine campaign is to keep the U-boats out of the Atlantic by shutting them up within the North Sea.

It is our belief that this can be done by building a continuous mine-barrier from the northerly point of the Shetland Islands across to the coast of Norway. This is the alternative method to the one which the Allies, including ourselves, are following; which method is to let the submarines scatter on the high seas, and then start a still hunt for them by means of destroyers, patrol boats and converted yachts.

The British Admiralty, with the "say-so" in this matter, object to building the net. First, for the reason that they claim it cannot be built and held in place; and, secondly, because they object to having any obstruction of this kind across the North Sea which might interfere with the free movement of their grand fleet should the German high seas fleet come out for another trial of strength. This being the situation, the allied fleets are committed to "submarine chasing."

The situation was put rather tersely to the writer the other day by a British naval officer who said: "Let the American inventor find the submarine for us and we will answer for killing it." This seems to us very much like begging the whole question; for anyone who has engaged in the hilarious pastime of fly or mosquito swatting knows perfectly well that if he can find the fly he can kill it. However, since we seem to be committed to a policy of letting the submarines roam the seven seas and choose their own time and place of attack, and since a destroyer or patrol boat cannot be in half-a-dozen places at one and the same time, the best thing to do is to arm the merchant ship and give it a chance to do its own killing.

In the course of the present series of submarine articles, we have illustrated quite a number of protective devices for ships which have been adopted or proposed—mostly proposed—and we do not hesitate to say that the most effective, as well as the one which is being most widely applied, is the mounting on the merchant ship of a good rapid-fire gun, and placing back of it a trained gunpointer, or "gunlayer" as the British call him, who can hit the target nine times out of ten under reasonable conditions of range and visibility.

No doubt to the eye of the expert gunner it must appear to be a rather miscellaneous collection—and necessarily so [some of the guns installed aboard foreign merchant ships—Ed.]; for when the call came for the arming of several thousand merchant ships posthaste, the various navy departments had to use what they could lay their hands upon, and many a gun which had gone to the storehouse because it was no longer serviceable for the crack ships of the fighting line of the navy was brought out and mounted for merchant ship defence. These guns vary in caliber all the way from the 3-inch up to the 6-inch; and though many of them may be minus telescopic sights and other refinements of modern naval artillery, they are still quite capable of reaching the submarine at any range at which the "sub" can fire its torpedo with any reasonable prospect of scoring a hit, and the shells, when they do get home, are quite capable of broaching the light plating of a submarine sufficiently to put her out of commission.

In view of the fact that most merchant ships to-day and all merchant ships within a few weeks' time will go armed with guns that are effective at from 5000 to 8000 or 9000 yards, it is probable that the Germans are blaming themselves for want of foresight when they cut down the range and speed of their torpedoes in order to double up on the charge of

explosive in the warhead. That policy was all right when merchant ships were unarmed and the shark of the sea could sneak up within a few hundred yards of its helpless victim and put one or two torpedoes into her without the least risk to itself; but when the rapid-fire gun began to poke its long snout over the taffrail of the merchant ship, Fritz realized that the boot was very much on the other leg. Either he must take chances on a long shot at a ship whose speed and course he could only approximately estimate, or he must take the risk of coming up within gun-shot range, with the chance of being disabled or sent to the bottom. But though the new situation was perplexing it was by no means hopeless, and the Germans have responded by building larger boats and mounting much heavier guns in the open. The latest U-boats carry two 5.9-inch, long-range rifles mounted permanently on deck. They are heavily coated with grease and no attempt is made to slide them down into a hatch-covered recess before submerging.

Now, the 5.9-inch gun has an effective range of something over 9000 yards, and it fires a 100-pound shell—shrapnel or high explosive, as the case may be. Moreover these latest boats carry three inches of armor on the conning-tower and we are informed—though we do not vouch for the truth of this—that in some cases the armed conning-tower has been sufficiently enlarged to constitute a barbette within which these powerful guns are mounted.

Be this as it may, we ought to take time by the forelock and mount on our new destroyers, converted yachts, and big patrol boats, and of course upon our merchantmen, the largest-caliber gun that can be provided and accommodated. Our long 51-caliber, 5-inch gun is a splendid weapon for this work. It has a very high velocity and flat trajectory, a rapid rate of fire, great accuracy, and is a fair match for the German 5.9 gun. Prudence and foresight suggest that our government should place orders for several thousand of these guns, so that we may be prepared to meet the increase in power of submarine armament, which undoubtedly is going to take place.

In the running fight between a merchant ship and a submarine the balance of advantage lies with the ship, and this for the following reasons: the merchant ship guns fire from a much steadier platform; they have a high command; the gunners are free from the interference of breaking seas and spray; and whereas a single well-placed shot will disable or sink the submarine, a merchant ship might receive 20 such before fatal injury was done to her engines or boilers.

All the above is written on the understanding that we are going to let the submarine get out on to the high seas and fight them there; but we draw attention to the fact that if the German U-boat fleet were shut in within the North Sea the chances of finding and sinking them would be enormously increased. Indeed, it is our firm belief that once the North Sea net was established, the conclusion of the German U-boat campaign would be a matter of only a few weeks' time.—*Scientific American*, 4/8.

ALLIES TO CONFER ON NAVAL ACTION.—It became known August 11 that the allied governments soon would begin a series of conferences with the object of a harmonization of plans and co-ordination of effort on all fronts and for more aggressive naval action.

While the United States Government, it is said, will not be represented in these exchanges, it will be kept fully informed of their progress and the arrangements made. The inter-allied conference which has just been concluded in London, following the Paris conference, is believed here to have been called to prepare a restatement of the Allies' war aims in conformity with the promise of Lloyd George, the British Premier, in response to Russia's declarations concerning peace.—*N. Y. Times*, 11/8.

FATE OF RAIDER "WOLFF" KEPT SECRET.—Answering a question in the House of Commons, put by Robert P. Houston, unionist member for the West Toxteth division of Liverpool, for information regarding the German raider *Wolff* in the Indian Ocean, and the raiders *Seeadler, Moewe, Vineta, Puyme* and others in the Atlantic, Thomas J. MacNamara, Parliamentary Secretary to the Admiralty, said the British Admiralty was "not without knowledge of the movements or fate of these vessels."

Mr. MacNamara emphasized the word "fate," but said it was obvious that to disclose what was known or unknown would be valuable to the enemy. It was not considered in the public interest, therefore, to reply more fully.—*N. Y. Herald*, 1/8.

EVASION OF THE BLOCKADE.—A British official order just issued says: "Large quantities of ship's stores have been found on board neutral vessels calling at, or diverted to, the United Kingdom or elsewhere, amounting to an evasion of the blockade regulations. In the case of vessels calling at the United Kingdom, Halifax or Sierra Leone, or other examination station inward bound to Norway, Sweden, Denmark or Holland, the quantities of ship's stores on board will be examined, private provisions and stores carried by master, officers, and men being taken into account. A liberal allowance will be made for the length of the voyage to Norway, Sweden, Denmark or Holland, as the case may be, and, as regards provisions, the ration per man per day will be calculated on the British seamen's statutory scale, or such lesser scale, as may be in force. Any surplus over and above the total so arrived at will be required to be discharged and placed in the Prize Courts."—*Shipping Illustrated*, 28/7.

GERMAN REPORT OF SINKINGS.—With figures for five days missing the tonnage of the merchant ships sunk by German submarines in the month of June totaled 781,093, according to a table compiled by the *New Yorker Staats-Zeitung*, based upon reports sent from Berlin by the Wolff semi-official news agency and printed in the neutral press. This brings the total sinkings reported by Berlin for the first five months of unrestricted submarine warfare up to 4,436,093 tons, divided as follows:

February	781,500 tons
March	861,000 tons
April	1,143,500 tons
May	869,000 tons
June (incomplete)	781,093 tons

The *Staats-Zeitung* concludes its summary by saying:

"Judging from these reports and the figures contained in them it is apparent that the completed toll of the submarine in June will prove to have been perfectly satisfactory to those who are placing their faith in the U-boat."—*N. Y. Times*, 26/7.

TRADING WITH THE ENEMY BILL.—We give below a synopsis of this measure, as passed by the House of Representatives:

Section 1 describes the bill.

Section 2 defines the word enemy, which shall, for the purpose of trading, include any individual, partnership or other body of individuals of any nationality, resident within the territory of a nation with which the United States is at war. The words "to trade" shall be deemed to mean (a) Pay, satisfy, compromise, or give security for the payment or satisfaction, of any debt or obligation. (b) Draw, accept, pay, present for acceptance or payment, or indorse any negotiable instrument or chose in action. (c) Enter into, carry on, complete, or perform any contract, agreement, or obligation. (d) Buy or sell, trade in, deal with, exchange, transmit, transfer, assign, or otherwise dispose of, or receive any form of property.

(e) To have any form of business or commercial communication or intercourse with.

Section 3 makes it unlawful for any person in this country, except with the license of the Secretary of Commerce, as provided in section 5, to trade, or attempt to trade with an enemy or on account of an enemy directly or indirectly; to try to trade with an ally of an enemy, or to transport or attempt to transport an enemy or an ally of an enemy.

Section 4 stipulates that no enemy or ally of an enemy, and no partnership of which he is a member or was a member at the beginning of the war, shall assume any name other than that by which he or such firm was known at the start of the war, except under license.

Section 5 empowers the President to suspend the provisions of the act and gives the Secretary of Commerce authority to grant licenses to persons to perform any act made unlawful in section 3 of this act without such license.

Section 6 authorizes the Secretary of Commerce to appoint an official to be known as the alien property custodian, who shall receive all money and property in the United States due or belonging to any enemy or his ally.

Section 7 rules that every corporation and every unincorporated association, or company, or trustees issuing shares or certificates representing beneficial interests shall under such rules as may be prescribed, transmit to the alien property custodian a full list of every officer, director or stockholder who is an enemy or ally residing within or without the United States.

Section 8 points out that any person, not an enemy, or ally of an enemy, holding a mortgage, pledge or lien on property of an enemy or ally of an enemy may dispose of such property under regulations to be provided.

Section 9 regulates the rights of any person not an enemy claiming interest in any enemy or other property which may have been conveyed or paid to the alien property custodian.

Section 10 defines how an enemy, or ally of an enemy, may file and prosecute an application for letters patent, or for registration of trade mark; provides for the payment of fees required by the laws of an enemy country in relation to patents, etc., and rules on applications of citizens who wish to manufacture under enemy owned or controlled patents.

Section 11 decides how all money deposited with the alien property custodian may be invested and declares that all property of an enemy shall be safely administered.

Section 12 provides that the master of a vessel before departure from port shall deliver to the collector of customs a statement that the cargo is not shipped or to be delivered in violation of law. The owners, shippers, or consignors of the cargo of such vessels are to make similar declarations.

Section 13 states that whenever there is cause to believe that the manifest or other statements are false the collector of customs is authorized to refuse clearance.

Section 14 appropriates $250,000 to be used in the discretion of the Secretary of Commerce to carry out the provisions of the act.

Section 15 provides that any person violating the act shall be fined not more than $10,000, or imprisonment for not more than ten years, or both.

Section 16 gives the United States district courts jurisdiction to make and enter all such rules as to notice and otherwise, and to issue such process as may be necessary.

Section 17 gives the several courts of first instance in the Philippine Islands and the district court of the Canal Zone jurisdiction of offence under the act.—*Shipping Illustrated, 21/7.*

THE FORCES OF FRANCE.—Pessimistic reports that the military resources of France have reached the point of exhaustion have been set at naught by an array of figures showing that country's actual strength, sent to Mr. Baker, Secretary of War, by Mr. Andre Tardieu, High Commissioner of the French Republic.

"July 30, 1917.

"Dear Mr. Baker: I brought to your knowledge, in a recent talk, the surprise I felt in reading so often in American newspapers some utterly inaccurate information regarding the military conditions prevailing in Europe and especially in the French Army.

"In connection with our conversation I believe it would be of interest to present to you some figures which, better than any comments, will expose to you the reality; these figures will show you France as she is, vigorous and powerful, in spite of three years of suffering without precedent in history.

"The strength in men, now present in the zone of the armies alone, shows the maximum figure reached during the war.

"This figure, which amounts to a little less than three millions of men, exceeds by over a million the number of men actually in the said zone at the beginning, and one must add to that figure the men in the zone of the interior and in the colonies.

"We are certain, with the resources of our metropolitan and colonial depots, to be able to maintain that number up to its present level for a long time to come.

"Our strength in men, by reason of a better command and of better methods of instruction, has shown since the beginning of the war constantly decreasing definitive casualties (killed, missing and those taken prisoners).

"The following figures substantiate this:

"Battles of Charleroi and of the Marne—5.41 per cent casualties (in proportion to the total mobilized strength).

"First six months of 1915—2.39 per cent (in proportion to the total mobilized strength).

"Second six months of 1915—1.68 per cent (in proportion to the total mobilized strength).

"First six months of 1916—1.47 per cent (in proportion to the total mobilized strength).

"Second six months of 1916—1.28 per cent (in proportion to the total mobilized strength).

"For measuring the offensive and defensive quality of the troops whose numerical strength I have indicated above I can do nothing better than to quote some more figures:

"The western front has an extention of 739 kilometers (462 miles).

"Twenty-seven kilometers (17 miles) are held by the Belgians.

"One hundred and thirty-eight kilometers (86 miles) are held by the English.

"Five hundred and seventy-four kilometers (359 miles) are held by the French.

"The French Army holds, accordingly, more than two-thirds of the western front—that is to say, of the front where the enemy has always directed its chief exertion.

"The German divisions in line on the western front were, moreover, in June, 1917, distributed as follows:

"Forty-two opposite to the English.

"Eighty-one opposite to the French.

"A German division holds an average front of 4 kilometers 700 meters; a French division an average front of 5 kilometers 500 meters—that is to say, one-sixth more.

"We were amply furnished with '75's' since the beginning of the war. The number of these guns was constantly increased; it is adequate to our needs.

"As for the heavy artillery, we had in August, 1914, 300 guns grouped in regiments. In June, 1917, we had 6000 of them, mostly modern.

"During our present offensives we have, on an average, one heavy gun for 26 meters (86 feet).

"If we sum up all the trench, field, heavy artillery we have one gun for 8 meters in the sector of attack.

"Our output in munitions was arranged in August, 1914, for 13,000 shots of '75's' a day. It is now arranged for 250,000 shots of '75's' and 100,000 shots of heavy guns.

"To be equal to this enormous production invaded France did not hesitate, in the midst of war, to create new industries and to bestow on military industries the best of its productive strength.

"If you consider on another side the weight of the projectiles shot on the German trenches during one of the last offensives you will find the following figures for one lineal meter:

"Field artillery, 407 kilograms.

"Trench artillery, 203 kilograms.

"Heavy artillery, 704 kilograms.

"High power artillery, 128 kilograms.

"Total, 1442 kilograms.

"Here below, lastly, come figures on the monthly expenditure in ammunition for the '75's':

"July, 1916, 6,400,000.

"September, 1916, 7,000,000.

"October, 1916, 5,800,000.

"During the last offensive the expenditure was 12,000,000 shots in all calibers.

"I might also add that we completely re-equipped and re-armed the Belgian, Serbian and Greek armies.

"I recall, likewise, that the number of heavy guns given by us to the Allies exceeds 800.

"The financial effort cannot be separated from the military effort. Here below are some of the figures:

"France has expended since the beginning of the war the following sums:

"1914, 8,040,000,000f. ($1,608,000,000).

"1915, 22,800,000,000f. ($4,560,000,000).

"1916, 32,640,000,000f. ($6,528,000,000).

"1917, 19,167,000,000f. ($3,833,400,000).

"Total, 82,167,000,000f. ($16,529,400,000).

"She received from foreign countries from August 1, 1914, to January 1, 1917, 6,000,000,000f. ($1,200,000,000).

"During the same period she loaned to several allied governments 4,000,000,000f. ($800,000,000).

"If France alone, who has only 38,000,000 inhabitants, and whose richest and most populated provinces are invaded, was by herself capable of such a financial effort, it is because of the strict discipline which she forced upon the employment of her resources.

"This discipline also is a proof of strength.

"Such is the situation. Severe was the ordeal. Stronger is the national energy.

"Now it is a question of striking the last blow to the adversary. You will help us?

"But, at the moment when the American soldiers arrive in France it is proper to let them know that they will find to receive them a country which, to-day as well as during the past three years, bears the principal exertion of our dreadful foe; a country which maintains to the maximum of her power, without hesitation and without weakness, her strength, her means and her will.

"Believe me, dear Mr. Secretary,

"Very sincerely yours,

"Andre Tardieu.

"To Hon. N. D. Baker, Secretary of War, Washington."

—*The Army and Navy Register*, 11/8.

THE GRAND FLEET.—The possibility that some time the Atlantic fleet may have occasion to share the vigilant function of tireless watching which has been masterfully performed by the British Grand Fleet imparts interest to some of the conditions which prevail in that command in the North Sea. A correspondent who has had the opportunity of observing the situation has this to say:

"Next to the preparedness of the fleet, both material and personnel, the most significant characteristics are the absolute fitness and the magnificent spirit seen in every ship among officers and men alike. It is an interesting and gratifying fact that the navy never before had such a clean bill of health as it has been given during the war; and this is all the more striking seeing that under the conditions at present obtaining physical exercises ashore are in many cases out of the question except at very rare intervals. To counteract disadvantages which might otherwise result from lack of facilities for such exercises everything possible is done. To maintain the everyday routine of each vessel and keep her fit for her particular duty, unceasing labor and watchfulness are essential, and so far as possible gymnastics and other exercises are included in the regular program. Even if it were practicable to give shore leave occasionally, there is little on shore to attract men, for the nearest town is miles away, and from the decks of the battleships not a house can be seen. But the sporting instinct among the men has asserted itself, and when opportunity offers they play football, while golf enthusiasts among the officers have, with very successful results, having regard to the unpromising nature of the ground, discovered means of indulging their hobby. The senior officer of Royal Marines in the battle squadrons is also making praiseworthy efforts to secure for the detachments for whose training he is responsible buildings on shore in which physical and other exercises may be engaged in.

"But with all these provisions the isolation of the portion of the fleet in those far Northern waters is undoubtedly much felt by officers and men, and the most striking evidence of this is the eagerness with which the mail bags, bringing letters and papers, are awaited, and the avidity with which news from home is read among all ranks and ratings. In the summer, when there is practically no darkness, the monotony of the life is not so pronounced as in the winter months, when the nights, it is said, are 16 hours long. Under these circumstances the splendid spirit of comradeship among officers and men is a magnificent asset, and in other ways efforts fruitful of results have been made to relieve what would otherwise prove dreadful monotony. It is with this object that there has been appropriated and specially fitted the steamer *Gourka*, which is known in the fleet as the "theater ship." Nearly every vessel has its little party of entertainers, and in several there is accommodation for a small audience; but in a ship with a complement of 1000 or more it is impossible for anything like that number to witness simultaneously an entertainment on board. It is to meet the needs of such ships in this respect that the "theater ship" has been provided, and it is answering its purpose admirably. The practice is for any vessels desiring the use of the *Gourka* to apply for her, and after the application has been granted the theater ship is placed alongside." —*Army and Navy Register*, 4/8.

FEATURES OF FOOD CONTROL BILL.—Here are some of the outstanding features of the food control law.

Government control of foods, feeds, fuels, fertilizer and tools, implements and equipment used in food production.

A one man food administration.

Drastic penalties against hoarding and speculation.

A licensing system giving the President complete power over dealers in necessities.

Enormous requisitioning powers for the President in obtaining war supplies.

Presidential authority to close exchanges and boards of trade if necessary to stop speculation in necessities.

Presidential authority to buy and sell wheat, flour, meals, beans and potatoes at reasonable prices.

A guarantee of $2 a bushel as the minimum price of No. 1 Northern wheat at the primary interior markets until May 1, 1919.

Prohibition against the use of foods in whiskey making and authority to the President if he sees fit to impose similar prohibition on beer and wine making.

Presidential authority to commandeer distilled spirits in stock and bond for redistillation for war purposes.

An appropriation of $10,000,000 to enable the President to buy and sell fertilizer to farmers.

An appropriation of $152,000,000 to enable the Food Administrator to carry out the purpose of the bill.—*N. Y. Herald*, 9/8.

ADMIRAL JELLICOE DISCUSSES SUBMARINE SITUATION.—Admiral Sir John R. Jellicoe, First Sea Lord and Chief of the Naval Staff, in an interview with The Associated Press, discussed the submarine menace and the naval situation at the end of the third year of the war.

"You ask me to say something of the submarine menace," he began. "It is serious because all the allied armies and civil population are, in varying degrees, dependent on sea transport. But, viewed broadly, the recourse of the Germans to this form of piracy is encouraging. They did not adopt it until they had lost hope in the victory of their armies. They did not risk drawing the United States into the war and concentrating on themselves the loathing of all other neutral states, until they were convinced that they could not float a keel on the world's seas and by legitimate means interfere with the growth of the military strength of the Allies.

"For three years naval power has been in process of translation into military power. The Germans in desperation decided to embark upon ruthless submarine warfare in the confident belief that it would prove a fatal stroke. In February, according to their own confession, it was the best and only means of a speedy and victorious ending of the war.

"March, April, May, June, and July have passed and their early hopes are still unrealized.

"The Germans have not mastered us, but, on the other hand, we have not mastered the submarine. We have not yet discovered the effective antidote. But we have reduced the losses of merchant shipping.

"There is no reason to doubt that the Germans have at sea lately a far larger number of submarines than in February and March, but, nevertheless, with the invaluable assistance which America has rendered, we have prevented them from reaping the harvest which they anticipated.

"How long the German population will live on hopes deferred I cannot profess to say, but they must realize that the prophecy of February, resting on official authority that the submarine was the best and only means of a speedy and victorious ending of the war, has not been fulfilled."

After a pause, Admiral Jellicoe went on, gravely:

"Combatting the submarine demands the utmost effort on the part of all the countries which have joined forces to defeat Germany. She has staked her all on the submarine, and if we defeat it her last hope will have gone.

"The two urgent needs of the moment are more patrol ships for hunting down submarines and an increased output of merchant shipping, so that the losses suffered at sea may be made good. The war has become one of economic endurance. With the powerful aid which the United States is rendering in making the naval blockade effective, Germany's condition must become worse week by week. She will hold out so long as there is the faintest hope of the success of the submarine warfare. Once its failure is demonstrated the German people, whatever may be the case with the German Government, will recognize that defeat stares them in the face.

"It is therefore vitally important that every effort be concentrated on destroying what the Prime Minister, Mr. Lloyd George, calls the 'bacilli of the seas.' We must and shall defeat it, but, in order to do so, the invention and constructive energy of all the nations fighting Germany must be devoted to the work and to the rapid building of patrol ships and merchantmen. If that is done, I have no doubt of the issue."—*N. Y. Times*, 2/8.

GERMANS SCOFF AT AMERICANS.—The German military leaders are still "whistling in the dark." The State Department August 3 received a cablegram containing the reported views of a German naval officer who, speaking for the military party, said that the entrance of the United States into the war was treated very lightly, and that America "will send over a crowd of untrained louts in wooden vessels that we can sink with hand grenades."

He added that even if the United States should send over 5,000,000 men, they would be scattered like chaff for lack of training.—*Washington Post*, 4/8.

MAJOR GENERAL MAURICE REVIEWS IMPORTANCE OF THE UNITED STATES ENTERING THE WAR.—America's entrance into the war is the most important development of the third year of the great conflict, in the opinion of Major General Frederick B. Maurice, chief director of military operations at the British war office, as expressed in an interview in which he reviewed the main events of the third year and summed up the present situation.

"To-day," Major General Maurice said, "Germany, whose whole military gospel was to prosecute a vigorous offensive, is reduced to 'a pitiful state of military helplessness, in which she is barely able to hang on' in the hope that her submarines will force the people of the entente powers to demand peace at a time when Germany has the 'big pawns' with which to make a bargain.

"Speaking from the military point of view," said Major General Maurice, "the greatest event of the third year of the war is the fact that the American people joined us. Up to the present, France and Russia always have been able to say to their people that the English power had not yet been developed to the fullest extent and that, when England's full weight was in the field, the pressure on the French and Russians would be somewhat loosened. That still is true, but only to a limited extent. Even England is getting near the point where she must say that she cannot extend her work much further in France. Meanwhile, the strain in the continental countries is becoming greater and greater and the French are in real need of more and more support.

"Of course, the same is true and probably in far greater measure in enemy quarters.

"But the whole lesson of the three years of warfare is to emphasize the military maxim that the man with the last reserves is going to win, and we still have got the whole power of the United States to draw upon. The United States is to-day the general reserve of the entente. With that reserve intact, we may look the fourth year in the face with entire confidence.

"Germany has made the same mistake with regard to the United States as three years ago she made with regard to England. She argued, 'We do not believe England will come in, but if she does come in, she is not a military nation and cannot become a military power soon enough to play any part in this war.' We proved that theory wrong, as you will prove her theories regarding the United States wrong.

"What was it that lead Germany into war with the United States? She found she could not win on land. It was necessary to try U-boat warfare. 'This,' said the German theorists, 'will defeat England and bring the reign of the entente to an end. We do not believe the United States will come

in, but, if she does, she is an unmilitary nation, has no army, cannot create one for many months, perhaps years, certainly cannot become a military factor soon enough to play anv part in this war.'

"That reasoning sounds unbelievable to us, but a drowning man catches at a straw. We believe the German theorists will be proved as wrong in their estimates of the United States as they were in their estimates of England.

"You asked me what is the outlook at the opening of the fourth year of the war. First, let me give you in epitome the history of the first three years as I understand it.

"The first year, broadly speaking was an attempt by Germany to put into effect elaborate plans which her military strategists had been preparing over the space of many long years. The first phase was a concentrated attack on France and Belgium during a certain allotted period of time, in which the Germans estimated it would be impossible for Russia to disturb them in the east.

"The attack on France was checked, first on the Marne, later on the Yser and at Ypres, although France and Belgium suffered severely in the process.

"Germany then, according to her plan, took the defensive on the western front and turned her offensive effort eastward in an effort to knock out Russia. Here again she failed, although her attack enormously weakened Russia's offensive power.

"In the autumn of 1915 Germany definitely abandoned her old prewar strategic scheme and started in on a new plan developed since the war began, namely, an effort to upbuild 'Mitel-Europa' as a great block composed of four so-called central powers which would command the road to the east. The autumn campaign of 1915 consisted, in essence, of the furtherance of this scheme by conquering Serbia, bringing in Bulgaria and halting our Dardanelles effort by rushing munitions, supplies and soldiers to the assistance of the Turks.

"By the winter of 1915 Germany had gained a long way toward realization of her own ambition, and this point represents to my mind the grand climacteric of German's offensive power. All this time Great Britain had been building up armies, and, with the beginning of 1915, we for the first time had a real army in the field.

"With the spring of 1916, Germany had come to realize that the conquest of Russia was impossible; Russia was too massive to kill or crush. So the German staff again turned on France and the Verdun attack was the result.

"With the defeat of Germany at Verdun came a turning of the tide, of which further manifestation was seen in a successful British offensive. Previous British military efforts had been, comparatively speaking, minor operations, or operations, or operations undertaken in support of the French. At the Somme we started our new work, and really great important work it was, although a great deal of the contemporary effect of the Verdun defeat and the Somme victory was neutralized by Germany's push into Roumania. The Roumanian push, however viewed in true historical perspective, was merely a flash in the pan. The German military power already was on the decline and her offensive strength was nothing like what it had been the year before.

"The end of 1916 found the situation between the two great groups of contestants about equally balanced, but the scales leaning slightly in favor of the entente.

"The year 1917 has presented a still rosier picture. During the whole third year of the war Germany and her allies have attempted nothing on land. They everywhere have been on the defensive. The Turks lost Bagdad and the Sina peninsula. On Germany's eastern frontier, although the Russian revolution enormously weakened Russia's military power, Germany was incapable of taking advantage of the situation. On the

Austrian front the Italians delivered in powerful blows. In the west the British and French struck repeatedly, and the Germans have been powerless to answer back.

"This is the pitful state to which we have reduced the great power whose whole military gospel was summed up in the phrase 'vigorous offensive.' Germany's military helplessness, owing to the long strain on her man-power, material and resources, is such that to-day she barely is able to hang on, and her only hope is that she may find some way of similarly wearing us down and forcing us out of the war before we get up momentum to drive her back.

"At present Germany is banking on the U-boat. She hopes against hope that the U-boat will reduce the people of the entente powers to the same state of want, privation and suffering which she has been enduring for years past. She hopes to make the entente peoples cry enough and start peace parleys while she still has got the big pawns with which to bargain at a peace conference."—*Washington Post*, 4/8.

WORTHLESSNESS OF GERMAN PLEDGES.—The Dutch Naval Authorities have now conclusively established the fact that the steamer *Kongsli* was struck and damaged by a German torpedo while in the "safety zone." At the time of the occurrence—in April last—doubts were expressed as to whether the vessel had been torpedoed or had struck a mine. The result of the Dutch inquiry furnishes another proof of Germany's unscrupulous methods, and shows how complete is that country's disregard not only for the dictates of humanity, but for her own guarantees. The *Kongsli* was damaged by explosion in the North Sea, off the Dutch coast. She was Norwegian owned, and under charter to the Commission for Relief in Belgium, for which body she was carrying a cargo of 7800 tons of wheat. The *Kongsli* sailed from America, and approached Holland through the "safety zone," in which zone she was steaming when a heavy explosion occurred. The vessel was carrying navigating lights on each of her sides, with a large piece of canvas brilliantly lighted and bearing in bright red letters the words "Belgian Relief." The Norwegian flag was flying aft, and lighted by electric lamps, while at the top of each of the two masts the Belgian Relief flag was flying. Thus there could have been no possibility of any mistake on the part of a German submarine. The sea was smooth and the visibility good at the time of the explosion. It is, therefore, definitely established that the *Kongsli* was deliberately attacked by a German submarine, notwithstanding the guarantee of immunity given by Germany to neutral vessels in the safety zone, and despite the definite German pledge that Belgian Relief vessels would be guaranteed absolute safety from attack provided they followed prescribed rules and remained outside the danger zone. This pledge was positively reaffirmed only seven days before the attack on the *Kongsli* by the German Governor-General of Occupied Belgium. It should be added that the German Government have taken no steps up to the present to disavow the action of one of their submarine commanders, nor have they offered any reparation for an attack which the pledged word of the German Government should have rendered impossible.—*Shipping Illustrated*, 11/8.

CAPTAIN PERSEUS SAYS BRITAIN STILL CONTROLS SEAS.—Captain Perseus, naval expert of the *Berliner Tageblatt*, in a review of the third naval year of the war, says that the superiority of the British fleet, despite heavy losses, is great enough to justify its claim that it controls the seas, and that the German fleet is unequal to meet it.

The high seas fleet, in conjunction with the coast defence guns, submarines, mines, etc., will undoubtedly be able to beat off all attacks and keep the enemy from the coast, but he adds that German minds should give no room to views of an offensive activity of the fleet, which is based on an insecure foundation and an unproved hypothesis.

All this contradicts the Admiralty view, frequently expressed in official and semi-official reports and in the Emperor's Skagerrak message, that the Germans had decisively defeated Britain and wrested from her the mastery at sea. All naval critics, except Captain Perseus, have promulgated this thesis.

Captain Perseus says that every intelligent German realizes that unrestricted submarining must be conducted with all energy until England realizes that it is more profitable to discuss peace than to accept further losses, but, on the other hand, he warns against super-optimism for too speedy success in the submarine war, in view of the amount of world tonnage and the great shipbuilding possibilities available for the entente.—*N. Y. Times*, 5/8.

FRENCH MINISTER OF WAR COMMENTS.—Paul Painleve, the French Minister of War, according to the *Evening Herald*, said before leaving London at the conclusion of the entente allied conference:

"America is quickly solving the tonnage problem, and will become a fruitful field for airplanes, machinery, steel and food. She already has sent many specialists, and is sending more, specially airmen and engineers.

"Then, in time for the decisive battles, will come her great armies. Her part will be great. Together, the British, American and French armies, will exert continuous pressure on the enemy, with staggering blows at such intervals as the high commands think fit.

"The Russian trouble will pass. We must be calm and patient.

"Complete accord in aim exists between the entente Allies, and their determination is strong. Together, without faltering, we will overcome the enemy in sanguinary battles, until the day comes when we, laying down our arms, will be able to say:

"'Our task is over. Justice will now reign between the free nations.'

"All Frenchmen are now in the fighting line or in war workshops, and French blood has been prodigally spilled on the battlefields. The whole French nation accepts the prolongation of the war as a rude duty, but a duty which must be faced, so long as the war is not brought to a point required by liberty and justice.

"British and French soldiers know that success is certain, and that it depends only upon the valor and steadiness of themselves and their Allies."—*Washington Post*, 9/8.

THREE U-BOATS LOST MONTHLY.—A Berlin dispatch, dated August 6, follows:

It is officially declared that contrary to rumors of overwhelming losses in submarines the monthly average is little more than three underwater boats lost during the period from February 1 to August, while the monthly increase in submarines constructed is many times larger.—*Washington Post*, 7/8.

ADMIRAL JELLICOE MINIMIZES GERMAN NAVAL RAIDS.—"The British Navy's control of the nerve system of maritime communications of the world at this juncture is more complete than the control exercised by the army of the Central Powers on land," said Admiral Sir John R. Jellicoe, First Sea Lord and Chief of the Naval Staff, in an interview with The Associated Press, in which he discussed the submarine menace and the naval situation at the end of the third year of the war. "That," he said, "suggests perhaps a train of thought which American students of the war might pursue with interest and advantage to the allied cause. But I am content at this moment merely to emphasize the supreme importance of the work which the grand fleet is doing under the command of Sir David Beatty.

"You ask me how it is that German destroyers are able to carry out raids from time to time. Such missions are intrusted to the swiftest vessels

under the German ensign, and they are carried out with every advantage on the side of the Germans. The North Sea is a very big area of water. It is more than twice as large as the whole United Kingdom—England, Scotland, Wales, and Ireland—which is traversed by nearly 24,000 miles of railway lines.

"The German destroyers wait for dark and then dash off from one of the bases situated within an hour or two of steaming of the British coast. They have the choice of an objective against a coast line of great length. There is hardly a point but is undefended, advantage having been taken of the immunity from bombardment which international law was believed before the war to confer.

"Now, mark these points: The enemy has the choice of nights when the weather and visibility are most suitable for his purpse. He puts to sea clear of his mind field. He can steam in a northerly, westerly, or southern direction. Aircraft are used for reconnoissance so as to gain information of the movement of the British patrol forces. The Germans have the further advantage of being able to fire at every craft which comes within sight the moment it is sighted.

"What is the position of the British patrol, whose vigilance has been subjected to three years of unceasing strain? Officers have many duties to carry out quite apart from punishing these 'tip and run' raids. They never know when the enemy ships will break out or where they will speed at their highest speed, and in the darkness they have to discriminate between friend and neutral on the one hand and foe on the other hand before they fire.

"Despite the advantages which the Germans enjoy, no raid has resulted in the slighest military gain to Germany or loss to Great Britain. Such a policy cannot be pushed successfully unless the enemy is prepared to support his destroyers with stronger forces—in other words, risk some portion of his high seas fleet—and thus the menace of our grand fleet operates.

"We deplore the loss of life among noncombatants; but, after all, we are engaged in a war whereon the freedom of the world depends, and we cannot deflect our strategy from its main purpose. That is what the Germans hoped to effect, and they have failed. At the same time, perhaps, I may add that since the exploit of the *Swift* and *Broke* the enemy has attempted no raid on the British coast.

"This leads me to say a few words as to the destroyer and submarine bases on the Belgian coast which are in the occupation of the Germans. One is Ostend; the other is Zeebrugge. The Germans have applied to this length of sand-fringed coast the same principle of intensive fortification adopted higher up on the North Sea and the Island of Heligoland. The coast line is studded with heavy guns, which in themselves constitute infinitesimal targets at a range of more than 20,000 yards on which any bombardment could be carried out. Moreover, the enemy has not been slow to make the fullest use of aircraft and smoke screens by way of protection.

"Ostend offers the best target, but it can only be attacked at rare intervals, when a favorable combination of wind, weather and sea conditions can be attained. Zeebrugge, in the real sense of the word, is not a naval base, but merely an exit from the inland port of Bruges, with which it is connected by a wide deep-water canal. There is little to hit at Zeebrugge. Still, I hope that the problem which the Belgian coast presents is not unsolvable."—*N. Y. Times*, 3/8.

GERMANY SEIZES ELECTRIC MACHINERY.—All electrical machinery and kindred apparatus in the German Empire have been requisitioned by the government, according to a report in the *Frankfurter Zeitung*, quoted in the London newspapers, and it is no longer possible to buy or sell electric motors without special permission.

An article in a recent issue of the *Kölnische Zeitung*, describing a visit to the imperial shipyard at Kiel, where a great deal of repairing is done, contained the following passage:

"Copper is now used in large quantities in all ships, although, of course, consumption is restricted as much as possible. Especially for steam piping there is no substitute for copper and it is also needed for all purposes where high resistance to sea water and salt air is necessary. Nothing seems yet to be known at Kiel about a scarcity of copper, and if our enemies think that they can starve us out by cutting off the red metal they will be just as much deceived in this as in the rest of their starvation schemes. It is pleasant to see how the long, thin copper tubes are formed, snake like, by skillful hands.

"Over against the boiler shop is the electrical shop, which becomes every day more important with the increased use of electricity. We have already gone a long way in this, although we have not yet gone quite so far as the Americans, who even drive the screw shafts of large ships by electric motors. As regards our submarines, it is indeed much the same with us, for our submarines already consist half of electricity. The submarines are also concerned with the accumulator shop, where accumulators are repaired. Repair is not always possible, for the demands made on the accumulators in war are sometimes too great."—*N. Y. Times*, 21/7.

GERMANY'S NAVAL AIRMEN.—It is fairly evident from the official statements and newspaper notices in Germany recently that the Zeppelins are exclusively commanded by naval officers, but some doubt still exists as to how far the navy has supplied pilots for heavier-than-air craft. Captain Victor Schütze, who was in command of the squadron of Zeppelins which made the raid on June 17, 1917, was a retired naval officer, who appears to have left the service when he had attained the rank of lieutenant commander in order to take up his father's business at Hanover. He had evidently had considerable experience in raiding England, and was found to have been decorated with the Iron Cross. The actual captain of the ship was Lieutenant Commander F. G. Eichler, also a retired naval officer, who had served in the merchant navy, and had been captain of the *Imperator* and *Vaterland*.. According to one account he had been a gunnery officer. The name of the captain of *L-43*, the Zeppelin which was destroyed by our naval forces in the North Sea on June 14, has not been mentioned, but there seems to be some evidence that the officer in charge of the Zeppelin which the navy destroyed about a year ago was Lieutenant Peterson, another naval officer who is supposed to have been serving in the High Sea Fleet when the war began. Mathy, Deitrich and Frankenberg, with other captains of Zeppelins destroyed by our anti-aircraft defences all appear to have been in the navy, and some of them to have had experience in the mercantile marine as well. The skill and pluck displayed by these seamen cannot be disputed, and from the accounts which have been published of their exploits in Germany it seems more than likely that they are under the belief that their efforts have been successful against points of military value. In discussing the question of reprisals it is only just to give the seamen in the Zeppelins credit, Huns as they are, for not making baby-killing their first object. It is more than probable that at the height they are now obliged to travel in their vulnerable targets they have but a vague idea of their whereabouts, much less are able to hit anything they aim at.—*Army and Navy Gazette*, 7/7.

AVIATOR'S EXPERIENCE.—A letter received from James Norman Hall, corporal in the Lafayette Escadrille, who was wounded and brought down in a fight with half a dozen Germans in July, has been forwarded to *The New York Times*.

It gives further a remarkable picture of the tactics of aerial scouting and fighting and an account of the psychological impression of many of the experiences of aviators in action.

Mr. Hall is an Iowa man who enlisted in the British Army in London in August of 1914 and served with the forces for a year and a half. He obtained his discharge because of personal affairs which necessitated his return to the United States, and as soon as possible he went back and enlisted in the Lafayette Escadrille. He is well known as the author of a war book, *Kitchener's Mob*, and a number of magazine articles, and many inquiries as to his condition have been received by his friends from all over the country.

"About two weeks ago I started to write a letter to you," Corporal Hall writes. "I spent one entire afternoon upon it and wrote a detailed history of the life at the front of the Escadrille Americaine. Alas! the letter was not finished! I had to put it aside to go out on patrol with the rest of the fellows, and while I was out I met a whole nest of Germans, got shot through the shoulder, and am now in hospital, out of action for at least six weeks to come.

"It all happened on June 26—or was it the 25th? Twelve of us went out at 7.30 p. m. and were to patrol the lines until 9.15. We were to have a rendezvous over Soissons at 10,000 feet and then to divide into two groups of six machines each, one patrol going to one section of our front and one to another. As often happens, the patrols got scattered. It is very difficult to keep together, for our machines are so fast, and we must keep turning and twisting all of the time when over the lines on account of the anti-aircraft guns. I lost my patrol and so kept on by myself, knowing that I would find them again sooner or later, as we had a particular well-defined sector to cover.

"The 'archies' were keeping me awfully busy. I had never had them burst so close to me before, nor so many of them at once. They bark when they are near, a sort of a 'woof, woof, woof,' which you hear quite plainly above the roar of your motor, and the concussion tips your machine up and down in a very uncomfortable manner. I was between 11,000 and 12,000 feet up, and yet those German gunners were planting them awfully close! They've got their work down to a science. By Jove, but they shot well! However, in a machine that travels at 125 miles an hour you simply laugh at archies—until one hits you.

"The trenches are a wonderful sight from the air, particularly during an attack. You see more of the detailed action, of course, and hear nothing. But you can see for miles and miles the long brown strip of ground that makes the firing line, and the flashes of the guns and the shell bursts. There is a tremendous fascination in seeing all this from an altitude of two miles, and to me—knowing, as I do, what it is like to hug the parapet under heavy shell fire—a horror in the sight as well. I went far down the line, so far that I could see Rheims and the tower of the Cathedral; then I came back, keeping a sharp lookout all of the time, tilting my machine first on one side, then on the other, and whirling around like a cat trying to catch its own tail. One's greatest danger in the air is that of being pounced on by surprise. You hear nothing but the roar of your own motor, and so keep twisting and turning on your own track constantly.

"Finally I saw six or seven machines about 5 kilometers back of the German lines. I couldn't distinguish whether they were French or German and decided to go over closer to have a look. The sky was marvelously clear, and it was a pretty sight to see them playing about in the air just like a school of fish in bright blue water. They looked so harmless and inoffensive in the distance, so over I went, bold navigator that I was! I got pretty close before they saw me, or at least before I knew that they saw me, and at that moment I realized that I was in for it. They were all German machines! One of them was just at my altitude. He was nearest to me. The others were about 1500 feet higher and some little distance further off.

"They all started for me. The nearest German and I opened fire about at the same instant. We passed each other like the wind, and not more

than 75 meters distant. Then my machine began to get peppered and I felt a smack in the shoulder as though some one had hit me with a club. It numbed my left side and arm and made me feel loggy, so that I lost control of my machine and it dived straight down with the motor full on. You can imagine the speed. I fell a deuce of a way before I could get the motor shut off. I straightened out then, but had fallen so fast that I was barely conscious.

"I started to fall again and said 'good-bye to life,' for I thought I was a goner. But I made a great effort and straightened out again when only about 600 feet above ground; I thought to myself, 'Now if I can only hold on to my wits until I land!' Then everything went black, and I didn't remember another thing until I was on a stretcher being carried over some trenches by a couple of poilus. Believe me, it was a relief to see those blue uniforms, to know that I was in the hands of friends. As it was, I fell right in a first line trench, not 300 meters away from the German line. Wasn't that luck? My machine was badly smashed, for as I have said, it landed itself, without any except sub-conscious help from me; but I have nothing except bruises, nothing broken except skin! It is really a miracle that I wasn't killed in the fall.

"They dressed my shoulder at a *poste de secours* in the trenches, and then I had a long and very painful ride on a two-wheeled stretcher cart. The Germans were shelling the French lines pretty heavily, and there were times when I thought we would never reach the ambulance. A big shell struck an ammunition dump in a ruined village shortly before we reached it. They took me through on the run. The whole place was in flame; I won't soon forget the sight. It was about 10 o'clock then, but the flames lit up all the desolate region for hundreds of yards.

"I spent a week at a large evacuation hospital and was then sent on a hospital train to Paris, and the American Ambulance Hospital at Neuilly. This place is really wonderful. The way they patch men up here passes the miraculous. America may well be proud of the hospital at Neuilly. I have a good clean wound. The bullet grazed my side, passed through my shoulder under the armpit, and came out my back. Another bullet hit me without doing any injury. I was born under a lucky star. Think I will be well in a month and will then probably be given two or three weeks convalescence.

"I've been decorated, exteriorly. A *croix de guerre* with palm and the *médaille militaire*. I don't deserve them; honestly I don't. There are fellows at the American Escadrille who have done far better service and who have received no medals. I do a foolish thing, get brought down, and they reward me for accomplishing nothing at all. That's justice for you. It's rather odd that recently I should have written a short article deprecating the practice of giving honors."—*N. Y. Times*, 1/8.

ATTACKING THE GREAT GERMANIC FORTRESS.—Picture Germany and Austria-Hungary as the square keep of a huge fortress, Turkey as a smaller keep and the Balkans as a barbican connecting the two and you have a graphic diagram of the war as the siege of the Teutonic fortress.

This gives an excellent idea of the situation of the combatants. The Teuton Powers are behind the walls of a single system of fortifications, while the Allies are striving to destroy the wall at various points from the outside, seeking to starve those within the fortress and digging their way beneath the walls. They must make a breach, widen it, make another, consolidate them, and thus crumble the entire defence, or they must starve out the garrison before they can win.

Besides the main bodies of the Teutonic fortress it may be said to have numerous citadels and bastions. Sallying out from the keep in 1914 and 1915 the Central Powers established two outworks, one in Belgium and Northern France and one in Russia.

The Belgian-French outwork was the stronger, better defined of the two. Its bastions, Zeebrugge, Vimy, Peronne and Moronvillers, were heavily fortressed positions. The Russian outwork was not so formidable and was less elaborate. Its defensive centers were Libau, Mitau, Baronovichi and Lutsk.

By securing Bulgaria and conquering Serbia the Teutons established themselves in the Balkans, thus constructing the Balkan barbican, which connected the main keep with the Turkish keep and the citadel of Constantinople. The citadel of Constantinople affords a means of communication between the main mass of the Teuton alliance and Asiatic Turkey, enabling the Central Powers to feed the war in Asia.

More important than this is the fact that it severs communication between Russia and the Western allies. The citadel of Constantinople is not limited by the city itself. It has four defensive centers, which may be depicted as the bastions of Adrianople, Gallipoli, Chanak and Scutari. Asiatic Turkey may be represented as a square enclosure, with four bastions, named after the chief centers of Turkish military power, Asia Minor, Syria, Mesopotamia and Caucasus.

In 1916 the Teutons established still another outwork in Wallachia.

The central fortress, or keep, has suffered practically not at all thus far in the war. The Vosges and Carso bastions are, however, pierced and the Bukowina bastion is partly gone. Just now the defenders are on the offensive and are attempting to wholly restore the Bukowina bulwark. In the two great outworks, manned by almost the entire garrison, the Vimy, Peronne, Moronvillers and Lutsk bastions have been taken and the Laon bastion is breached.

Constantinople remains untouched, but Asiatic Turkey is a crumbling ruin, with two of its main bastions destroyed and a third breached, but it cannot be said that the long line of positions from the Baltic to the Arabian Desert has been pierced while Constantinople, dominating the straits and the Bosphorus holds out.

In the barbican of the Balkans the one bright spot for the Allies is the holding of the Salonica bastion.

Carrying out the simile of the huge fortress, which includes whole nations within its bulwarks, one may picture the garrison rushing from one point of the walls to another to stem off or beat back assaulting parties.

When Field Marshal Haig launches his armies at one of the western gates the garrison speeds there to repair the breach, if one is made, perhaps to attempt a sally to beat back or confuse the attackers. Then comes a drive by General Petain's men and the garrison must be shifted again. When the Russian millions hammer at the eastern gates men must be called from the west, but they are always inside the fortress.

The sorties are becoming gradually weaker and the assaults more sustained and stronger, yet the walls have not been pierced considerably at any point. Perhaps they will crumble suddenly; perhaps they will hold until the garrison is starved.

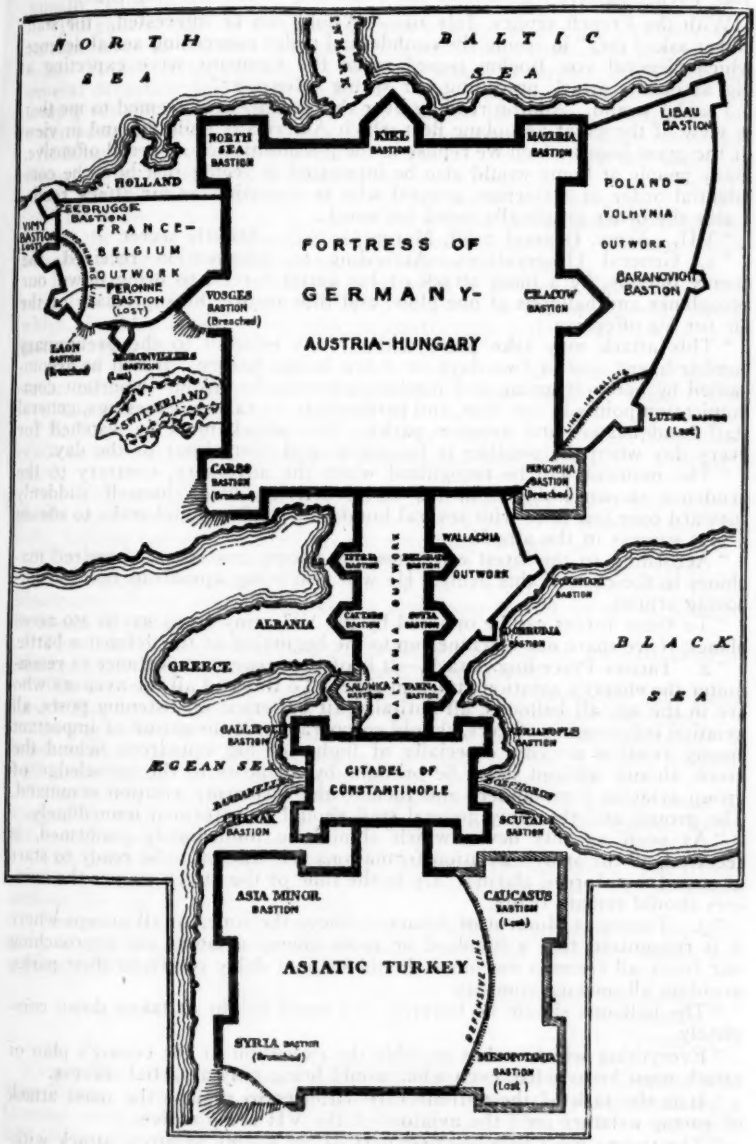
In one respect the Germanic fortress differs from the stone walled strongholds of the ancient Teuton war lords. It is to a certain extent self-provisioning. It does not depend absolutely for its food on the supply which was within its enclosures when the fighting men first sallied out.

Even with an air-tight siege, a condition which the allied armies and navies are fast approximating, the fortress has spacious farm lands, rich mines and the means of manufacturing weapons.

Not only are there the farms of Germany and Austria-Hungary to feed the soldiers and the civilian population, but the Balkan barbican provides a protected route for food from Asia Minor and from the vast wheat fields of Roumania.

As to food, it is possible that failure or destruction of crops may so shorten rations that discontent and political unrest may result.

Meanwhile new weapons and new armies are being brought up before the walls constantly to dash against the great fortress.—*N. Y. Herald*, 5/8.



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GERMAN CAMPAIGN ORDER.—A special correspondent of the *Evening Star* (Washington) transmitted the following to the *Evening Star:*

With the French armies, July 19.—"Would you be interested," the staff officer asked me, "in seeing the confidential order concerning aerial defence which General von Boehm issued when the Germans were expecting a big aeroplane attack preceding our spring offensive?"

I said I would. And on reading over this document it seemed to me that in view of the great aeroplane fleet which America is building, and in view of the great hopes which we repose in the possibilities of an aerial offensive, many people at home would also be interested in seeing just how the confidential order of a German general who is expecting an air attack reads. I give the order practically word for word:

"VII, Army, General Staff, March 31, 1917.—Strictly secret.

"1. General Observations.—According to information received, the enemy intends, by a mass attack of his aerial forces, to bring down our aeroplanes and balloons at one blow, and thus insure the supremacy of the air for his offensive.

"This attack may take place without any relation to the preliminary bombardment, one or two days, or a few hours, before. It will be accompanied by bomb-dropping and machine-gun attacks on our important communication points in our rear, and particularly on railway crossings, general staff headquarters and aviation parks. This attack must be watched for every day when the weather is favorable, and every hour of the day.

"The moment will be recognized when the adversary, contrary to the prudence shown hitherto in his aerial activity, flings himself suddenly forward over our lines with several hundred aeroplanes and seeks to obtain a first success in the attack.

"According to the latest estimates, the enemy has several hundred machines in the zone of this army. He will also bring squadrons from neighboring armies.

"To these forces can be opposed by the VII army from 200 to 250 aeroplanes, if we spare our machines up to the beginning of the defensive battle.

"2. Tactics Preceding Attack.—It is of the greatest importance to reconnoiter the enemy's aviation attack in time. To this end all the aviators who are in the air, all balloons, all anti-aircraft batteries, all listening posts, all aviation information officers, should co-operate. Confirmation of important enemy aviation activity, especially of flights of big squadrons behind the front, should without delay be brought by all posts to the knowledge of group aviation commanders and then to the VII army aviation command. The groups and the army general staff should be informed immediately.

"As soon as this news, which should be immediately confirmed, is received, all the army's aviation formations are ordered to be ready to start at once (re-enforced alarm). Up to the time of the attack proper the aviators should remain ready.

"3. Tactics at Moment of Attack.—Above the zones of all groups where it is recognized that a hundred or more enemy aviators are approaching our front, all German machines should without delay return to their parks, avoiding all unequal combats.

"The balloons should be lowered to a small height or taken down completely.

"Everything which makes possible the execution of the enemy's plan of attack must be avoided, even what would bring only a partial success.

"It is the task of the anti-aircraft batteries to repulse the mass attack of enemy aviators until the aviators of the VII army arrive.

"The troops must bear the first part of the enemy aviators' attack without counting on the protection of German aviators.

"The groups should announce to the VII army general staff, and the group commanders should announce to the aviation command that strong enemy squadrons are flying over the first line. The following report

should be sent: 'Mass incursion of enemy aviators in the———zone, ——hour,———approximate number.' An automible will be kept continually ready to start.

"The general staff of the army decides whether or not the incursion must be considered as the great attack of French aviators which is expected.

"4. Tactics After Attack.—If the mass attack is verified I will order the general departure for the aerial battle. The aviation command of the VII army gives the order to the VII army aviation formations. Moreover, the order passes through the general staff. The order will be thus conceived:

"'Mass attack of enemy aviators in the———zone. We are attacking. Departure for assembling formation at———o'clock.'

"If possible this order will be given out an hour in advance.

"This order will then be given to the groups by the army general staff and to the group commanders by the aviation command. Receipt should be acknowledged by repeating the very text of the order.

"In case telephonic communication with a group is interrupted and receipt is not acknowledged the order is given to the neighboring group, which should transmit it by auto, in conformity with paragraph 11, 1-10, last memorandum.

"When groups are familiar with the order they are forbidden to prescribe contrary measures to the formations depending on them. That would lead to the disunion of forces.

"Each group may keep six machines in reserve. All other aeroplanes ready to start must be immediately warned and must start at the hour indicated.

"5. The Aerial Battle.—All the VII army machines which have started should reach their assembling point at as small a height as possible, and then only, turning toward the north, reach a fighting height.

"The fighting squadrons 1, 13, 14, 17, 19 will assemble above Marle.

"The fighting squadrons 15, 22 and all other machines will meet in the Montcornet-Rozoy zone. The fighting squadrons should, as far as possible, lie above the other machines.

"The line Le Herie-Marle-Montcornet should not be crossed until 45 minutes after the time set for departure, going south.

"The before-mentioned fighting squadrons should begin the fight going west. The other machines will reach the front by the shortest route.

"In a general way the battle should be fought over the German front. It is necessary to attack with the greatest energy. A victory at this moment will insure us the moral superiority for the defensive battle.

"The enemy once beaten, should be pursued. But the pursuit must be stopped in time, so as to avoid the losses which would be caused us by the enemy's anti-aircraft batteries.

"This order should go in writing only as far as the divisions. The troops should be informed orally that they must bear the first part of the attack without the aid of German aviators.

"The aviation chiefs, the anti-aircraft artillery command of the VII army and the balloon detachment chiefs will take whatever steps are necessary to keep this order secret.

"Signed: The General Commanding the Army,
"VON BOEHM."

—*N. Y. Times*, 13/8.

EXPERIENCES OF A CANADIAN AVIATOR.—The intrepidity of Captain William Bishop, a Canadian member of the Royal Flying Corps, in attacking a German airdrome single-handed, has been rewarded by the bestowal upon him of the Victoria Cross, the most prized of the British valor medals. The *Official Gazette* gives the following account of the action which brought Captain Bishop his decoration:

"Captain Bishop flew first to an enemy aerodrome. Finding no enemy machine about, he flew to another aerodrome 3 miles distant and about

12 miles inside the German lines. Seven machines, some with their engines running, were on the ground. He attacked these from a height of 50 feet, killing one of the mechanics.

"One of the machines got off the ground, but Captain Bishop, at a height of 60 feet, fired 15 rounds into it at close range, and it crashed to the ground. A second machine got off the ground, into which he fired 30 rounds, at 150 yards. It fell into a tree. Two more machines rose from the aerodrome, one of which he engaged at a height of 1000 feet, sending it crashing to the ground. He then emptied a whole drum of cartridges into the fourth hostile machine and flew back to his station.

"Four hostile scouts were 1600 feet above him for a mile during his return journey, but they would not attack. His machine was badly shot about by machine-gun fire from the ground."—*N. Y. Times*, 13/8.

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DIPLOMATIC NOTES

FROM JULY 18 TO AUGUST 18

Prepared by A. F. WESTCOTT, PH. D., Instructor, U. S. Naval Academy

On August 14, Pope Benedict issued a Pronunciamento proposing peace terms on the basis virtually of a return to the *status quo ante bellum*, with clauses proposing reduction of armaments, "freedom of the seas," and an indefinite paragraph regarding damages and reparation. Territorial disputes, for instance between France and Germany, and between Austria and Italy, would be settled by subsequent arbitration. The text, a translation from the French made public by the State Department August 16, follows:

To the Rulers of the Belligerent Peoples:

From the beginning of our Pontificate, in the midst of the horrors of the awful war let loose on Europe, we have had of all things three in mind: to maintain perfect impartiality toward all the belligerents, as becomes him who is the common father and loves all his children with equal affection, continually to endeavor to do them all as much good as possible, without exception of person, without distinction of nationality or religion, as is dictated to us by the universal law of charity as well as by the supreme spiritual charge with which we have been intrusted by Christ; finally, as also required by our mission of peace, to omit nothing, as far as it lay in our power, that could contribute to expedite the end of these calamities by endeavoring to bring the peoples and their rulers to more moderate resolutions, to the serene deliberation of peace, of a "just and lasting" peace.

Whoever has watched our endeavors in these three grievous years that have just elapsed could easily see that, while we remained ever true to our resolution of absolute impartiality and beneficent action, we never ceased to urge the belligerent peoples and governments again to be brothers, although all that we did to reach this very noble goal was not made public.

About the end of the first year of the war we addressed to the contending nations the most earnest exhortations, and in addition pointed to the path that would lead to a stable peace honorable to all. Unfortunately, our appeal was not heeded, and the war was fiercely carried on for two years more, with all its horrors. It became even more cruel, and spread over land and sea, and even to the air, and desolation and death were seen to fall upon defenceless cities, peaceful villages, and their innocent people.

And now one one can imagine how much the general suffering would increase if other months or, still worse, other years were added to this sanguinary triennium. Is this civilized world to be turned into a field of death, and is Europe, so glorious and flourishing, to rush, as carried by a universal folly, to the abyss and take a hand in its own suicide?

In so distressing a situation, in the presence of so grave a menace, we, who have no personal political aim, who listen to the suggestions or interests of none of the belligerents, but are solely actuated by the sense of our supreme duty as the common father of the faithful, by the solicitations of our children who implore our intervention and peace-bearing word, uttering the very voice of humanity and reason—we again call for peace, and we renew a pressing appeal to those who have in their hands the destinies of the nations. But no longer confining ourselves to general terms, as we were led to do by circumstances in the past, we will now come to more concrete and practical proposals and invite the governments of both belligerent peoples to arrive at an agreement on the following points, which seem to offer the base of a just and lasting peace, leaving it with them to make them more precise and complete.

Disarmament.—First, the fundamental point must be that the material force of arms shall give way to the moral force of right, whence shall proceed a just agreement of all upon the simultaneous and reciprocal decrease of armaments, according to rules and guarantees to be established, in the necessary and sufficient measure for the maintenance of public order in every state; then, taking the place of arms, the institution of arbitration, with its high pacifying function, according to rules to be drawn in concert and under sanctions to be determined against any state which would decline either to refer international questions to arbitration or to accept its awards.

Freedom of Seas.—When supremacy of right is thus established, let every obstacle to ways of communication of the peoples be removed by insuring, through rules to be also determined, the true freedom and community of the seas, which, on the one hand, would eliminate any causes of conflict, and, on the other hand, would open to all new sources of prosperity and progress.

Reparation.—As for the damages to be repaid and the cost of the war, we see no other way of solving the question than by submitting as a general principle complete and reciprocal condonation, which would be justified, moreover, by the immense benefit to be derived from disarmament, so much so that no one will understand the continuation of a similar carnage, solely for reasons of an economic order.

Return of Territory.—But these specific agreements, with the immense advantages that flow from them, are not possible unless territory now occupied is reciprocally restituted. Therefore, on the part of Germany, there should be total evacuation of Belgium, with guarantees of its entire political, military, and economic independence toward any power whatever; evacuation also of the French territory; on the part of the other belligerents, a similar restitution of the German colonies.

Arbitration.—As regards territorial questions, as, for instance, those that are disputed by Italy and Austria, by Germany and France, there is reason to hope that, in consideration of the immense advantages of durable peace with disarmament, the contending parties will examine them in a conciliatory spirit, taking into account, as far as is just and possible, as we have said formerly, the aspirations of the population, and, if occasion arises, adjusting private interests to the general good of the great human society.

The same spirit of equity and justice must guide the examination of the other territorial and political questions, notably those relative to Armenia, the Balkan States, and the territories forming part of the old Kingdom of Poland, for which, in particular, its noble historical traditions and suffering particularly undergone in the present war, must win, with justice, the sympathies of the nations.

These we believe are the main bases upon which must rest the future reorganization of the peoples. They are such as to make the recurrence of such conflicts impossible and open the way for the solution of the economic question, which is so important for the future and the material welfare of all of the belligerent states. And so, in presenting them to you, who at this tragic hour judge the destinies of the belligerent nations, we indulge a gratifying hope, that they will be accepted and that we shall thus see an early termination of the terrible struggle, which has more and more the appearance of a useless massacre.

Everybody acknowledges, on the other hand, that on both sides the honor of arms is safe. Do not, then, turn a deaf ear to our prayer, accept the international invitation which we extend to you in the name of the Divine Redeemer, Prince of Peace. Bear in mind your very grave responsibility to God and man. On your decision depend the quiet and joy of numberless families, the lives of thousands of young men, the happiness, in a word, of the peoples, for whom it is your imperative duty to secure this boon.

May the Lord inspire you with decisions conformable to His very holy will. May Heaven grant that in winning the applause of your contemporaries you will also earn from the future generations the great title of pacificators.

As for us, closely united in prayer and penitence with all the faithful souls who yearn for peace, we implore for you the divine spirit, enlightenment, and guidance.

Given at the Vatican, Aug. 1, 1917.

BENEDICTUS P. M. XV.

ATTITUDE OF WARRING POWERS.—In view of the close relations between the Vatican and Vienna, and the aid given by the Catholic Center party in Germany in passing the Reichstag peace resolutions, it is believed that the Pope has offered terms which, if the Allies would accept them, Germany and Austria would also accept.

On August 18, Secretary Lansing announced that the Pope's proposals were "under very careful consideration" and that the United States would reply in a communication separate from that of the other allied powers. In the press, the impression prevailed that this reply would be unfavorable to the Pope's proposals.

GERMANY

MICHAELIS ON WAR AIMS AND PEACE TERMS.—In his first speech in the Reichstag on July 19, Chancellor Michaelis, after reviewing the military and naval situations, and denying the ability of the United States to transport an effective army to France and provide it with supplies, discussed as follows Germany's peace terms:

What we wish is, first, to conclude peace as those would who have successfully carried through their purpose. The present generation and coming generations should retain this time of war and trial as a vivid memory, as a time of unprecedented sorrow, of execution and willing sacrifices by our people and our army for the centuries to come. A nation of not even 70 millions, which, side by side with its loyal allies, has held its place, weapon in hand, before the frontiers of its country against the manifold superiority of masses of nations, has proved itself unconquerable. To me our aims are clear from this situation.

First of all, the territory of the Fatherland is inviolable. With an enemy who demands parts of our Empire we cannot parley. If we make peace we must in the first line make sure that the frontiers of the German Empire are made secure for all time. (Loud cheers.)

We must by means of an understanding (cheers from the left and center) *and give and take (Ausgleich) guarantee the conditions of existence of the German Empire upon the continent and overseas.* Peace must build the foundation of a lasting reconciliation of the nations. It must, as is expressed in your resolution, prevent the nations from being plunged into further enmity through economic blockades, and provide a safeguard that the league in arms of our opponents does not develop into an economic offensive alliance against us. These aims may be attained within the limits of your resolution as I interpret it.

We cannot again offer peace. We have loyally stretched out our hand once and met with no response, but with the entire nation, with the German Army and its leaders in accord with this declaration, the government feels that if our enemies abandon their lust for conquest and their aims of subjugation and wish to enter into negotiations we shall listen honestly, and ready for peace, to what they have to say to us. Until then we must hold out calmly, patiently, and courageously.—*London Times*, 21/7.

LLOYD GEORGE'S COMMENTS.—A speech by Lloyd George in Queen's Hall, London, on July 21, contained the following passages in reference to the German Chancellor's address:

Referring directly to the German Chancellor's sneering remark that America had no ships and no army, and that when America had an army she would have no ships to bring them across the sea, the Premier said: "He knows America just as little as the Germans knew Great Britain."

He said he had sought in the Chancellor's speech for something from which he could hope for the ending of the bloody struggle.

"But," he declared, "I see in it a sham independence for Belgium, a sham democracy for Germany, a sham peace for Europe; and I say that Europe has not sacrificed millions of her gallant sons to set up a sanctuary for sham."

"There are phrases for men of democratic minds, but there are phrases to satisfy the Junkers, and there are other phrases which mean nothing. It is the speech of a man waiting on the military issue. It is a speech that may be made better by improving the military situation, and if the Germans win in the west, if they destroy the Russian army in the east, if the Turks drive Great Britain out of Mesopotamia, and if the U-boats sink more merchant ships, then that speech, believe me, means annexation all around and military autocracy more firmly.

"What manner of government the Germans choose to rule over them is entirely a matter for the German people themselves, but as to what manner of government we can trust to make peace, that is our business. Democracy is in itself a guarantee of peace, but if it cannot be got in Germany, then we must secure other guarantees as a substitute."

The speech of the German Chancellor, continued the Premier, meant that for the moment the military party in Germany had won and showed that those in charge of affairs had elected for war.—*N. Y. Times*, 22/7.

GERMAN CHANCELLOR ACCUSES FRANCE.—On July 28, Chancellor Michaelis, in a reception to press representatives, offered evidence intended to show aggresive aims on the part of the Allies. The gist of his accusation is contained in the following passage regarding an alleged secret treaty between France and Russia:

I publicly ask the French Government this question: "Does it deny that M. Briand and M. Ribot, in the course of that secret sitting at which there were present the Deputies M. Moutet and M. Cachin, who had just returned from Petrograd, were forced to confess the fact that France, shortly before the Russian Revolution, had come to an agreement having in view vast plans of conquest with the government of the Tsar, a government which Mr. Lloyd George described in his last speech as a 'corrupt and narrow autocracy'? I ask if it is true that the French Ambassador in Petrograd, M. Paléologue, in response to a request sent by him to Paris, received instructions to sign a treaty with Russia which had been prepared in advance by M. Doumergue after negotiation with the Tsar? Is it true or not that the French President, at the instance of General Berthelot (the head of the French Military Mission in Rumania), formally entrusted him with such a mandate and that M. Briand afterwards sanctioned this step? This treaty assured to France her frontiers of 1870, but amended on the lines of previous wars of conquest, that is to say, they were to include, besides Alsace-Lorraine, the Saar basin and vast territorial modifications on the left bank of the Rhine, as desired by France. When M. Terestchenko took office the Russian Government protested against this arrangement and other French aims of conquest, which also included that of Syria, and declared that the new Russia would no longer be willing to take part in the struggle if it learned these French war aims. Was not the principal object

of M. Thomas's journey to Russia to overcome this remorse of M. Terestchenko's?"

The French Government will not be able to deny all this, and will be obliged to confess, even though it may be only tacitly, that M. Briand was the object of violent attacks during the secret session, and that M. Ribot was obliged to produce the secret treaty in response to a demand by M. Renaudel, and also that M. Briand in the course of the excited debate which ensued declared that Revolutionary Russia was obliged to carry out what Imperial Russia had promised, and that it did not matter to France what was said by the lowest classes in Russia. It is characteristic that M. Moutet, according to his own statement, replied in Russia to the question whether Alsace-Lorraine was the only obstacle to peace by saying that he could not answer the question in that form, and that the Russians ought to take into consideration the fact that the Russian Revolution had been purchased by French blood.—*London Times*, 30/7.

PREMIER RIBOT'S REPLY.—In his reply to the German Chancellor's accusations, Premier Ribot, in the Chamber of Deputies on July 31, said:

"The Chancellor's version contains gross inaccuracies and absolute lies, notably regarding the rôle he attributes to the President of the republic in giving an order to sign a treaty unknown to Premier Briand. The Chambers know how things passed. M. Doumergue (former Premier and Foreign Minister), after a conversation with the Emperor demanded and obtained M. Briand's authorization to take note of the Emperor's promise to support our claim to Alsace-Lorraine and to leave us free to seek guarantees against fresh agression, not by annexing territories on the left bank of the Rhine, but by making an autonomous state of these territories which would protect us and also Belgium against invasion.

"The Chancellor refrained from speaking about my declaration March 21, wherein I repudiated in France's name any policy of conquest and annexation by force. He has wilfully forgotten my language May 22 in the Chamber, saying we were ready to enter into conversations with Russia as to the object of the war and if the German people, whose right to live and develop peacefully we do not contest, understood that we wished peace founded on the right of the people, the conclusion of peace would thereby be singularly facilitated."

THE NEW MICHAELIS MINISTRY.—Dispatches of August 6 announced the resignation of four German Imperial secretaries, and five Prussian ministers. The new appointments to Imperial offices included:

Dr. Richard von Kühlmann, former Ambassador to Turkey, to succeed Dr. Alfred Zimmerman, appointed in November, 1916.

Dr. Karl Helfferich, to continue as Vice-Chancellor.

The Landrat von Graevinitz, to be Chief of the Imperial Chancellory.

Herr Waldraff, Mayor of Cologne, to be Minister of Economics, separated from Ministry of the Interior.

Herr Schwander, Mayor of Strassburg, to be Minister of the Interior.

The vacant Prussian Ministerial posts were filled as follows:

Minister of Justice—Dr. Peter Spahn, leader of the Catholic Center Party in the Reichstag.

Minister of the Interior—Under Secretary Drews.

Minister of Instruction—Ministerial Director Schmidt.

Minister of Agriculture—Dr. Essen-Hartruthe.

Minister of Finance—Dr. Hertz.

Dr. Peter Spahn, following his appointment, announced his intention to leave the Reichstag. Thus the new Ministry gives no indication of closer connection between the Cabinet and Parliament.

GERMANY'S NEW FOREIGN SECRETARY.—Abram I. Elkus, who was Ambassador to Turkey while Dr. von Kühlmann, Germany's new Foreign Secretary, was the German Ambassador, said last night that "Dr. Kühlmann, through his very great knowledge of American language and affairs, would be able to understand and appreciate the American viewpoint in the war, even if he could not agree with it."

Mr. Elkus also said that the new Foreign Secretary was a man of unusual force.

"He is also a broad man," continued the former Ambassador. "What is more, he knows English and reads and speaks it perfectly, as he does, of course, French. He has read our books and understands our perspective. And before we entered the war at least, he was, I know from our talks at Constantinople, friendly to the United States."

Before going to Turkey as Ambassador he was for seven or eight years Counselor of the Germany Embassy at London. So he also knows conditions in England very well. He was at one time connected with the German Embassy at Washington, I think, as a Secretary. He remained in Washington for a year, I should say, and then was in diplomatic service in Holland and Germany.—*N. Y. Times*, 7/8.

GERMANY TO FOOT WAR BILLS.—Zurich, Switzerland, July 30, (via London, July 31.)—Germany has notified Turkey and Bulgaria that she will assume all expenses incurred by those countries in the campaign of 1917-1918.—*N. Y. Times*, 31/7.

REICHSTAG ADJOURNED.—The Reichstag adjourned on July 20, to reassemble on September 26.

NEW EVIDENCE ON RESPONSIBILITY FOR WAR.—In the Philadelphia *Public Ledger* of August 6, ex-Ambassador Gerard published the first installment of his book on the war. This included a reproduction of the autograph text of a hitherto unpublished message from the German Emperor to President Wilson, responding to the latter's offer of mediation. The message, dated August 14, 1914, gives a German version of events leading up to hostilities. The official text, differing but slightly from that printed by Mr. Gerard, was given out by the State Department August 13, as follows:

Secretary of State, Washington.

August 14, 3 p. m.

The following was communicated personally to me by the Emperor in writing:

"Private and confidential.

"For the President personally.

"1. The Royal Highness Prince Henry was received by his Majesty King George V, in London, who empowered him to transmit to me verbally that England would remain neutral if war broke out on the Continent involving Germany and France, Austria, and Russia. This message was telegraphed to me by my brother from London after his conversation with his Majesty the King, and repeated verbally on the 29th of July.

"2. My Ambassador in London transmitted a message from Sir Edward Grey to Berlin saying that only in case France was likely to be crushed England would interfere.

"3. On the thirtieth my Ambassador in London reported that Sir Edward Grey in the course of a private conversation told him that if the conflict remained localized between Russia—not Serbia—and Austria, England would not move, but if we mixed in the fray she would take

quick decisions and grave maneuvers. In other words, if I left my ally Austria in the lurch to fight alone England would not touch me.

"4. This communication being directly counter to the King's message to me, I telegraphed to His Majesty on the 29th or 30th thanking him for the kind message through my brother and begging him to use all his power to keep France and Russia, his allies, from making any war-like preparations calculated to disturb my work on mediation, stating that I was in constant communication with his Majesty the Czar. In the evening the King kindly answered that he had ordered his government to use every possible influence with his allies to repudiate taking any provocative military measures. At the same time his Majesty asked me I should transmit to Vienna the British proposal that Austria was to take Belgrade and a few other Serbian towns and strip of country as a main mise to make sure that the Serbian promises on paper should be fulfilled in reality. This proposal was in the same moment telegraphed to me from Vienna for London quite in conjunction with the British proposal. Besides, I telegraphed to his Majesty the Czar the same as an idea of mine before I received the two communications from Vienna and London. As both were of the same opinion, I immediately transmitted the telegrams vice versa to Vienna and London. I felt that I was able to tide the question over and was happy at the peaceful outlook.

"5. While I was preparing a note to his Majesty the Czar the next morning to inform him that Vienna, London, and Berlin were agreed about the treatment of affairs, I received the telephone message from his Excellency the Chancellor that in the night before the Czar had given the order to mobilize the whole of the Russian Army, which was of course, also meant against Germany, whereas up till then the southern armies had been mobilized against Austria.

"6. In a telegram from London my Ambassador informed me he had understood the British Government would guarantee neutrality of France and wished to know whether Germany would refrain from attack. I telegraphed to his Majesty the King personally that mobilization, being already carried out, could not be stopped, but if his Majesty could guarantee with his armed forces the neutrality of France I would refrain from attacking her, leave her alone, and employ my forces elsewhere. His Majesty answered that he thought my offer was based on a misunderstanding, and, as far as I can make out, Sir Edward Grey never took my offer into serious consideration. He never answered it. Instead, he declared England had to defend Belgian neutrality, which had to be violated by Germany on strategical grounds, news having been received that France was already preparing to enter Belgium, and the King of the Belgians having refused my petition for a free passage under guarantee of his country's freedom. I am most grateful for the President's message.

"WILHELM."

BELGIAN MENACE INVENTED.—According to press dispatches of August 11 via Copenhagen, Lieut. General Baron von Freytag Loringhoven, Chief of the Supplementary General Staff of the German Army and one of Germany's leading military historians, has printed an article which proves the falsity of the legend that France threatened attack through Belgium. The article contains these passages:

"The French main concentration was originally accomplished between Belfort and the Belgian frontier, and the first indication that they contemplated a German advance through Belgium resulted in a shift to the left. * * * * The Entente Allies recognized only on August 17 that strong German forces also were advancing in a wide enveloping movement on the left bank of the River Meuse, where previously they had assumed that only an army of cavalry, strengthened by some infantry, was present.

"In consequence of the original erroneous concentration directed toward the east, the French Fifth Army did not succeed in advancing beyond the line of Dinant-Charleroi by August 22, and was forced to content itself with holding the passages of the rivers Sambre and Meuse."—*N. Y. Times*, 12/8.

GERMANY'S ECONOMIC GRIP ON HER ALLIES.—The Hague, Aug. 11.—Considerable importance is attached to the conference of representatives of Germany, Austria-Hungary, Bulgaria, and Turkey, which began yesterday at Vienna for the preparation of an economic agreement. Germany has been protesting vigorously against what she calls the wicked machinations of the Entente for countering economic discriminations, such as were practiced in the past, but in the meantime, with her usual foresightedness, she has been preparing far-reaching protectionist plans. Germany's idea is to create a solid economic union with Austria-Hungary, Bulgaria, and Turkey, which would mean absolute German dominion over all the natural resources in those far-stretching regions, and would free Germany for a state-aided attack on the world markets.

An enormous scheme for the reconstruction of the German mercantile fleet at a cost of many millions of dollars is sufficient indication that big ideals are contemplated. Doubtless, too, Germany is beginning to fear the competition of America's merchant fleet in the war.—*N. Y. Times*, 12/8.

RUSSIA

FULL POWER TO KERENSKY.—Following the resignation of Premier Lvoff and the Kadet (Constitutional Democrat) ministers on July 18, M. Kerensky took over the task of forming a new Cabinet. The joint Congress of the Council of Workmen's and Soldiers' Delegates and the Council of Delegates of the Peasants on July 23 voted supreme and unrestricted power to the government, as embodied in the following resolution, passed by a majority of 252 to 57:

Recognizing that the country is menaced by a military débâcle on the front and by anarchy at home, it is resolved:

First.—That the country and the revolution are endangered.

Second.—That the Provisional Government is proclaimed the Government of National Safety.

Third.—That unlimited powers are accorded the government for re-establishing the organization and discipline of the army for a fight to the finish against the enemies of public order and for the realization of the whole program embodied in the governmental program just announced.

On July 24 Premier Kerensky announced a new Cabinet of ten members, including five Socialists, and five members of non-Socialist parties. The government announced its intention of exerting a strong hand, renewing the death penalty in the army, ending the activities of radical extremists, and closing the frontiers until August 16.

CABINET REORGANIZED.—Following a breakdown of negotiations to bring Constitutional Democrats into the Cabinet, and accusations of disloyalty directed against M. Tchernoff, Minister of Agriculture, the entire Russian Ministry, save the Vice Chancellor, resigned, but later withdrew their resignations.

A new Cabinet was announced on August 6, with the following tentative list of members:

Premier, Minister of War and Marine, Alexander F. Kerensky.
Vice Premier and Minister of Finance, N. V. Nekrasoff.
Minister of Foreign Affairs, M. I. Terestchenko.
Minister of Interior, M. Absentieff (Social Revolutionary, lately released from penitentiary).
Minister of Public Instruction, M. Oldenburg (Constitutional Democrat and member of the Academy of Sciences).
Minister of Labor, M. Skobeleff.
Minister of Trade and Industry, M. Prokopovitch.
Minister of Social Tutelage, M. Astroff (Mayor of Moscow, Constitutional Democrat).
Minister of Supplies, M. Pieschehonoff.
Minister of Justice, M. Yefremoff.
Procurator of the Holy Synod, M. Kartasheff.
Minister of Communications, M. Takhtamisheff.
Minister of Posts and Telegraphs, M. Nikitine (Social Democrat).
State Controller, F. A. Golovine (Constitutional Democrat).
Minister of Agriculture, M. Tchernoff (Socialist).
Assistant Minister of War, M. Savinkoff.

In this Cabinet, three ministers, Kerensky, Terestchenko, and Nekrasoff, survive from the Lvoff Cabinet. In addition to these, four are carried over from the July 24 Cabinet—Tchernoff, Pieschehonoff, Yefremoff, and Skobeleff.

Extreme radicals were dropped from the Cabinet and representatives of the *bourgeoisie*, or moneyed middle class, added. Thus there are four Parliamentary Socialists and one Social Democrat facing four of the bourgeois element who appear as Constitutional Democrats. The latter have the support of the four non-Socialists from the late Cabinet—Terestchenko, Nekrasoff, Yefremoff, and Prokopovitch (a director of department in the Ministry of July 24).

The varied makeup of the new ministry is indicated, however, by the inclusion of M. Absentieff, a red revolutionist of the first order, and M. Savinkoff, organizer of the "social revolution."

RUSSIAN MILITARY COLLAPSE NOT FATAL.—Referring to the Russian military situation, the *Manchester Guardian* contained the following passage:

Even now, with the Russian armies retreating before inferior forces of the enemy, the situation is much better than it was just before the fall of the Stürmer Ministry. *Then there was danger of Russia's concluding a separate peace. There is no such danger now;* for, however weak the Russian armies may be, they will remain "in being," compelling the Germans to keep strong forces opposite them, and preventing a German concentration in the west, such as would neutralize the effects of American intervention.

GREAT BRITAIN

CABINET CHANGES.—London, July 17.—Sir Edward Carson has relinquished his post as First Lord of the Admiralty and joined the War Cabinet without portfolio. Sir Edward will be succeeded by Sir Eric Campbell Geddes, who has been Director General of Munitions Supply.

Winston Spencer Churchill succeeds Dr. Christopher Addison as Minister of Munitions, Dr. Addison becoming a minister without portfolio in charge of reconstruction.

Edwin Samuel Montagu, a former Cabinet Minister, is made Secretary for India. He is one of the very few members of the Asquith administration, in which he was Minister of Munitions, to join the Lloyd George Ministry.

The appointment of Sir Eric Geddes as First Lord of the Admiralty is another break with the tradition that the ministers should be members of one of the legislative houses. The new First Lord is a railway man, not a politician. Until recently he was in charge of the whole army transportation, then he became Controller of the Admiralty, with charge of naval construction, and such a rapid rise to the position to which he is now appointed is quite remarkable, and another instance of how Premier Lloyd George breaks with old political traditions.

The appointment of Sir Edward Carson to replace Mr. Bonar Law as the fifth member of the War Cabinet is likely to create strong criticism among the older Liberals. The War Cabinet now in practice consists of only four men, Mr. Henderson, the Labor member, being still in Petrograd. Of these four, Earl Curzon, Lord Milner, and Sir Edward Carson are all conservatives of the most extreme type.—*N. Y. Times*, 18/7.

BRITISH DELEGATES TO STOCKHOLM.—On August 1, Mr. Arthur Henderson, labor leader and member of the British War Cabinet, was severely criticized in Parliament for his attendance during the preceding week at a Socialist conference in Paris. The object of this conference was to consider the question of sending delegates to the proposed international Socialist conference at Stockholm. The question was raised in Parliament whether Mr. Henderson attended the conference with the approval of the Cabinet. Commenting upon Mr. Henderson's attitude the *London Times* of August 2 pronounced his purposes "absolutely sound and patriotic," but questioned whether he was not "excessively preoccupied with Russian opinion, which has already shifted in many directions and is still shifting."

On August 10, under the direction and by the advice of Mr. Henderson, the conference of the British Labor Party at Westminster decided by a card vote of 1,046,000 to 55,000 to send delegates to Stockholm. Mr. Henderson advocated this action on the ground that such action was desired by Russia and that it would be dangerous for the Russian delegates to meet at Stockholm only representatives of enemy and neutral powers.

HENDERSON LEAVES CABINET.—On the following day Mr. Henderson resigned from the Cabinet. In accepting his resignation, Premier Lloyd George censured him sharply for alleged misrepresentation to the Cabinet of the attitude he would take in the conference, and for concealing from the conference the true position of the Russian Government regarding the Stockholm gathering. According to the Premier, the Russian Government had written that "although they did not deem it possible to prevent Russian delegates from taking part in the Stockholm Conference, they regarded it as a party concern, and its decision as in no way binding on the liberty of action of the government."

NO PASSES FOR STOCKHOLM DELEGATES.—Announcement was made in the House of Commons on August 13 that no permission would be granted by

Great Britain, France, Italy, and the United States to any persons from those countries desiring to attend as delegates the International Socialist Conference at Stockholm.

In making this statement, Mr. Bonar Law, the government spokesman, added that, "The same decision has been made by the governments of the United States, France, and Italy, with which His Majesty's Government have been in communication."

It was announced that Mr. Barnes, labor leader and member of the Cabinet, would take Mr. Henderson's place in the War Council.

KERENSKY FAVORS STOCKHOLM CONFERENCE.—London, Aug. 16.—The Petrograd correspondent of *The Daily News* telegraphs a conversation he had with Premier Kerensky. When the subject of the Stockholm Conference was mentioned Kerensky fired up and said:

"There has been a serious misunderstanding. They are drawing a wrong deduction from our note. We meant simply to state our position. We are a coalition government, and, therefore, since the conference is a party matter we cannot as a coalition be bound by its decisions. Our conference, the conference of governments, is the London Conference. The Swedish Conference is a conference of labor parties. That is all we wished to say. That does not mean that we are opposed to it, it is not our business to be opposed to it or in favor of it."

The correspondent then said:

"But it has been said that Albert Thomas declared you said you were personally opposed to the Stockholm Conference."

"Nothing of the sort," said Kerensky. "I think it is of great importance, although personally I think it would have been of greater importance if it had taken place while we were advancing instead of in the present condition. But I am not opposed to it; no. I have insisted again and again that any opposition offered to it by the allied governments, any difficulties put in way of delegates, is simply playing into German hands."—*N. Y. Times*, 17/8.

PARIS CONFERENCE ON NEAR EAST.—The Paris Conference of the Entente Powers upon the Balkan situation closed July 27, when it was announced that Entente troops would be withdrawn from old Greece, Thessaly, and Epirus, leaving only a force in the triangle formed by the Santi Quaranti road and the Epirus frontier. Corfu is retained as a military and naval base. This withdrawal in no way affects the military front in Macedonia.

The Paris Conference was followed by a second conference in London, at which Baron Sonnino, Italian Foreign Minister, presented the Italian point of view regarding the situation in Greece and the Adriatic. Italy's and Serbia's interests on the eastern Adriatic coast are reported to have been reconciled.

ITALY'S ADRIATIC AND ALBANIAN CLAIMS.—Milan, July 20.—The *Giornale d'Italia*, for the first time during the war, has clearly stated Italy's aspirations and interests in the Mediterranean, Adriatic, and the Balkans as it is believed they will be stated at Paris by Baron Sonnino.

In the first place, says the journal, Italy believes that her claims to Trent and Trieste are universally recognized by the Allies and correspond to the French claims to Alsace-Lorraine. In the second place, the Adriatic question was already settled by the Pact of London in a manner satisfactory to all parties. As Serbia cannot seriously pretend to refuse Italy those

strategic and economic positions in the Adriatic which are hers by inherent right, and by the right of her sacrifices in the war, neither has Italy any intention to deny the right of Serbia to those Adriatic positions corresponding to her economic needs, and has no reason to withdraw from Serbia the benevolence she has always manifested towards her. Thus every dispute between Italians and the Yugo-Slavs is the work of irresponsible people and is inspired by the common enemies of Italy and Serbia.

Italy, continues the *Giornale d'Italia*, desires the independence of Albania and not its division between the Balkan peoples, nor that it be devoured by Austria, but on her part Italy has no territorial aspirations in Albania, only demanding a strategic base at Avlona. Italy asks that independent Albania shall have as its southern limit Cape Stylos (according to the London and Paris agreements) in order that Greece may not transform the Corfu canal into a strategic base such as would diminish the value of Avlona. Italy wishes Greece to enjoy the fruits of the second Balkan war, but that Greece should respect Albanian independence, and the strategic interests of Italy.

Regarding the Eastern Mediterranean, the journal says that if the peace decisions are inspired by the principle of territorial renunciation, Italy will never violate this condition. But should the Allies, for one reason or another, wish to take possession of Asiatic Turkey, the imperialism of others cannot be met by an Italian renunciation, and this not from imperialistic motives, but from the just desire that the equilibrium of power should not be disturbed to Italy's harm.—*London Times*, 24/7.

FRANCE

FRANCE'S WAR STRENGTH.—A letter from André Tardieu, French High Commissioner to the United States, to Secretary Baker, containing some surprising statistics as to the French forces and their recent losses, has been made public. It is stated that the strength in men present in the zone of the armies alone amounts to a little less than three million men, and that it is greater by a million men than that of the forces in the zone at the beginning. Of the 739 kilometers on the western front, 574 are held by the French, 138 by the British, and 27 by the Belgians. The industrial development of France for war purposes may be measured by the statement that, though the nation had when the war began but 300 heavy guns grouped in regiments, it now has 6000, and that during the recent offensives there has been an average of one heavy gun for each 26 meters. The number of "75s" has been greatly increased, and the output of munitions now allows for 250,000 shots of "75s" and 100,000 shots from heavy guns daily. M. Tardieu states that France has re-equipped and re-armed the Belgian, Servian and Greek armies, and that of the total of 82,647,000,000 francs she has spent she has loaned her Allies 4,000,000,000 francs. The commissioner's figures were presented with the object of combating misinformation and showing France "as she is, vigorous and powerful."—*N. Y. Nation*, 9/8.

ADMIRAL LACAZE LEAVES CABINET.—Paris, August 2.—Rear Admiral Lacaze, Minister of Marine in the French Cabinet, handed his resignation to Premier Ribot to-day.

Rear Admiral Lacaze has held the post of Minister of Marine ever since the organization of the Briand War Cabinet in November, 1915. He is 55 years old, and is esteemed one of the most progressive of French naval officers.

The French Cabinet has been under fire in the Parliament for weeks, but little has been forthcoming to indicate any special criticism of the conduct of French naval operations.—*N. Y. Times*, 3/8.

SPAIN

GENERAL STRIKE.—Madrid, Aug. 13.— The strike begun on Friday night by the railroad employees became general at an early hour this morning when the masons, printers, carpenters, and other workmen quit work. As the men received their orders to lay down their tools they went quietly home and no incidents so far have been reported.

According to dispatches of August 15, six persons were killed and nine wounded in a clash between soldiers and strikers at Barcelona. Martial law has been proclaimed throughout Spain as a result of the strike, which arises from economic pressure due to the war.

FAR EAST

SIAM AT WAR WITH GERMANY.—London, July 22.—Siam has declared that a state of war exists with Germany and Austria, according to a Reuter dispatch from Bangkok. Nine steamers, aggregating 19,000 tons, have been seized.

The object of Siam's declaration is to "uphold the sanctity of international rights against nations showing contempt for the principles of humanity and respect for small states."

All Germans and Austrians, the dispatch adds, have been placed under arrest and their businesses closed.

Siam, the first absolute monarchy to join the conflict, is the fifteenth nation to ally itself with the Entente Allies.—*N. Y. Times*, 23/7.

CHINA ENTERS THE WAR.—London, August 14.—Reuter's Limited has been officially informed that China has declared war against Germany and Austria-Hungary, the declaration dating from 10 o'clock this morning.

China is the 17th nation to array itself against the Central Powers. The decision of the Chinese Cabinet to declare war on Germany and Austria-Hungary was reached August 2, and the action of the members of the Ministry was approved by Feng Kwochang, the acting President of the republic.—*N. Y. Times*, 15/8.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Behind the German Veil." By J. M. de Beaufort (Count van Maurik de Beaufort). With maps and illustrations. $2.00 net. (New York: Dodd, Mead, and Company.)

To one who has read much concerning the present war, its causes, developments, and prospective outcome several paragraphs of this book are pessimistically cheering. Too many writers have busied themselves discovering and announcing weaknesses and flaws in the German national front; evidences of the desire for peace; and above all the crumbling of the military system and its autocratic government. So it is cheering to have the enormity of the task which faces us brought to our clear gaze and to be told that we can perform that task, not if we sit and wish, but only if we will to win; this is material which the average apathetic man should read—or have read to him.

To quote the author on this point:

"They must be beaten, and they can be beaten only by the memory of those that have sacrificed their lives; disabuse yourself of the illusion that it is done already."

"Perhaps Germany wants peace now, but only because she wants to have foundations left upon which to build a new organization, a new stupendous war-machine, which in 10 years from now would dwarf anything the world has yet seen, heard, or imagined."

The book is an interesting account of a trip through Germany in 1915, including a visit at von Hindenburg's headquarters on the eastern front. Its principal point of interest to members of the Institute will be found in the nine chapters which deal with coast defence, naval policy and the German fleet. While there is nothing startling or absolutely new in these chapters, they serve to arouse in the reader much thought and profitable professional speculation.

J. W. G.

"The Land of the Deepening Shadow." Germany at the Third Year of War. By D. Thomas Curtin. 337 pages. $1.50 net. (New York: George H. Doran Company.)

Having spent the greater part of 1916 in Germany, the author makes an estimate of her internal condition and gives us the benefit of his conclusions. The value of the book lies in the analysis of existing economic conditions, the study of the mutual relation of government and people, and the estimate of the strength of the governmental control of the situation.

The author gives a vivid and graphic picture of material and spiritual Germany in the third year of the war. His account of the methods used

by the government in the execution of the policy of binding the people through educational methods of misrepresentation and deception are extremely illuminating.

The author's interpretation of the meaning of "the deepening shadow" and his estimate of the rate of its approach are perhaps influenced by his dearest hopes. We can only hope with him; but prophecy on this subject is the idlest of present day pastimes. J. W. G.

"Nautical Astronomy, Etc." Navigation & Nautical Tables. $4.00 per volume. (Scranton, Pa.: International Text Book Co.)

In the United States there are very few schools or colleges in which the subject of Navigation is taught; consequently hundreds of men, since the outbreak of war, have been attempting self-instruction in that branch of knowledge which, in the minds of most people, is one of the most serious barriers to be sealed in the progress from forecastle to quarterdeck. Satisfactory books for self-instruction in any subject are rare, particularly so in a subject that requires a foundation of more mathematics than the average man ever has acquired and a use of trigonometry comparable to a bank clerk's use of arithmetic.

The two books, "Navigation and Nautical Tables" and "Nautical Astronomy, Ocean Meteorology, International Rules" published by the International Text Book Company represent a very fairly successful attempt to produce such text books.

The necessary foundation of trigonometry and astronomy is laid without reference to other text books, the diagrams throughout are unusually good and the various problems are treated clearly and with a wealth of illustration by examples so that each step in every process is made plain.

Treatment of Current Sailing with the preliminary remarks on composition and resolution of forces is excellent. The localities in which fairly well-known currents exist are numerous and too little attention is paid in most text books to the subject. Moreover, a proper understanding of the effect of a known current is apt to put the navigator on his guard against similar unknown currents, probably the most fruitful of all causes of shipwreck.

The section on Compass Error and Compensation is perhaps the poorest in the book. To some extent this is inevitable, as a complete treatment requires too much mathematical theory for a popular treatise. The order of compensation, however, advising the permanent placing of quadrantal correctors before semicircular deviation is compensated is absolutely wrong in principle and will produce unnecessarily large residual deviations in practice, since the deviation on semi-cardinal points of the uncompensated compass may be very largely a semicircular deviation.

The inclusion of tables in such a book is undoubtedly a convenience to the student, but the space available limits the size and value of the tables materially and it would seem that the general value of the books would be enhanced by leaving out the tables entirely, making use of "useful tables" published by the Hydrographic Office and basing the text on those tables. The following are the most noticeable defects of the tables:

The tables of Natural and Logarithmic Functions have no tables of proportional parts for use with seconds of arc which makes them clumsy for particularly accurate work.

Traverse tables are for distances up to 300 miles only.

The squares of the intervals from noon for use in Reduction to Meridian sights are carried only to 13 minutes which is not far enough when conditions are good, and a table giving the product of the variation of altitude in one minute from noon by the square of the interval would be much more convenient.

The use of degrees instead of points in steering and for chart work is becoming more and more general so that a table for finding the distance of an object by two bearings in degrees and the run between is most desirable.

There is no table of Haversines.

There is no table of Combined Correction for Altitude of Sun and Stars.

The sections on Meteorology, International Rules, Maritime Law, etc., hardly bear on the subject of navigation, but are very useful and enhance the value of the books.

Finally, the books need revision. Diagrams, text and tables are adapted to the compass card marked in quadrants. The modern American compass card showing the division into degrees from 0° to 360° is not used, although the bearings in the Notices to Mariners issued by the government have been in that form for some years. The new American Nautical Almanac differs considerably from that of 1899, from which data is taken for the problems, and all problems should be reworked to correspond to the 1917 or 1918 Almanac and excerpts from that Almanac substituted for those from the 1899 Almanac. The sine-cosine formula is used in working Marcq Saint Hilaire sights, probably because no table of Haversines is available in the book. The cosine-haversine formula is more convenient and is almost universally used.

E. B. F.

"Examples in Battery Engineering." By Prof. F. E. Austin. Price $1.25. (Hanover, N. H.: Published by the author.)

This book sets forth in 16 lessons the more important problems that are met in the practical applications of primary and storage batteries. After a brief résumé of physical units and physical and chemical laws, two lessons are devoted to such simple theory as is essential in gaining a practical understanding of batteries. Numerous examples are worked out illustrating battery power and efficiency, the charging of batteries from both direct and alternating current mains, and the grouping of cells to meet various requirements. Helpful diagrams are given throughout the text.

The book contains much information useful to operators of electrically equipped automobiles and should prove valuable to engineering students generally as well as to those who are engaged in practical electrical work.

J. B. A.

"Directions for Designing, Making and Operating High Pressure Transformers." By Professor F. E. Austin. Price 65 cents. (Hanover, N. H.: Published by the author.)

Written for experimenters who desire to build their own apparatus, this little book of 46 pages teaches the principles and operation of transformers incidental to the building. The direct subject of the book is the design and construction of a 20,000 volt transformer for use in radio and laboratory work.

"Across France in War-Time." By W. Fitzwater Wray, "Kuklos." 50 cents. (London: J. M. Dent and Sons, Ltd.; and New York: E. P. Dutton and Co.)

An account of a trip undertaken in September, 1914, to see and describe, as the foreword puts it "not war-time in France but France in war-time." The author journeyed a wheel across France from St. Malo to Vitry le François around which had raged the battle of the Marne. From this point he passed through the region of westernmost German advance until interrupted and shipped to LeHavre. His mode of travel brought him in close touch with the inhabitants of the country traversed and the towns through which he passed; a fact that is reflected in the personal intimate nature of the story as told.

"Soldier's Spoken French." By Helene Cross. 60 cents net. (New York: E. P. Dutton and Co.)

According to the publisher's statement which is corroborated by a careful inspection of the contents: "This is the urgently needed short cut to the amount of French which it is necessary that our men who go to France should be able to speak. No more—no less. Not a conventional 'phrase-book,' but compiled from a real course of spoken lessons as given to New Zealand's soldiers. The binding is waterproof and the book will fit the pocket of a uniform.

"The Soldier's English and French Conversation Book." Compiled by Walter M. Gallichan. 30 cents net. (Philadelphia: J. B. Lippincott Company.)

The introduction by the compiler explains well the need and object of this "vest pocket" volume of 123 pages: The purpose of this handbook is to help the soldier in ordinary conversation with the French and Belgian Allies during war-fare. The compiler has sought carefully to include only those words and phrases likely to be of use to the soldier. For this reason the book is quite different from the ordinary phrase-books compiled for the holiday-tourist. . . . . With the aid of this book the stranger should be able to make himself understood both in France and Belgium.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fourth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control, and, if their report be favorable, the Secretary and Treasurer shall make known the result at the next meeting of the Institute, and a vote shall then be taken, a majority of votes cast by members present electing."

Sec. 8. The annual dues for regular and associate members shall be two dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be thirty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.00. Single copies, by purchase, 30 cents; issues preceding January, 1917, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1918

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award for the prize will be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1918. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the PROCEEDINGS of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the PROCEEDINGS of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

6. An essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

8. It is requested that all essays be submitted typewritten and in duplicate, if practicable; essays submitted written in longhand and in single copy will, however, receive equal consideration.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

J. W. GREENSLADE,
Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

"The Mutual Relations of Gunnery and Tactics."

"The Place of the Naval Officer in International Affairs."

"The Evolution of Naval Doctrine from National Character."

"The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."

"The Organization, Employment and Training of Reserve Fleets and Flotillas."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

1914

The Great Lesson from Nelson for To-day. Prize Essay, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. N.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

MILITARY PREPAREDNESS. Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. N.

1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.

TACTICS. Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. N.

DEFENCE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention. 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.

NAVAL PERSONNEL. First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.

EDUCATION AT THE U. S. NAVAL ACADEMY. Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. N.

SOME UNDERLYING PRINCIPLES OF MORALE. Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.

LARGE *vs.* A GREATER NUMBER OF SMALLER BATTLESHIPS. Lippincott Prize Essay. By Lieut. Commander Thomas Lee Johnson, U. S. N.

1917

Commerce Destroying in War. Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.

THE PEOPLE'S RÔLE IN WAR. First Honorable Mention, 1917. By Lieutenant H. H. Frost, U. S. Navy.

THE NATION'S GREATEST NEED. Second Honorable Mention, 1917. By Colonel Dion Williams, U. S. Marine Corps.